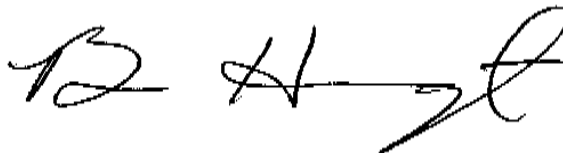


**WABASH RIVER BANK COAL TAR MITIGATION WORK PLAN
FORMER WESTERN TAR FACILITY
2525 PRAIRIETON ROAD
TERRE HAUTE, INDIANA
KERAMIDA PROJECT NO. 13490**

Submitted to: **U.S. ENVIRONMENTAL PROTECTION AGENCY-REGION 5**
Verneta Simon, On-Scene Coordinator
Emergency Response Branch II, Response Section III
77 West Jackson Blvd Mail Code SE-5J
Chicago, Illinois 60604

Submitted for: **CAVU OPS., INC.**
Mr. Joe Card
P.O. Box 10159
Terre Haute, Indiana 47801

Submitted by: **KERAMIDA INC.**
401 North College Avenue
Indianapolis, Indiana 46202
(317) 685-6600



Brian Harrington
Vice President, Field Services



Reviewed by:

Andrew A. Gremos, L.P.G., C.H.M.M.
Senior Vice President

December 7, 2009

**WABASH RIVER BANK COAL TAR MITIGATION WORK PLAN
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December 7, 2009

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- 1 Proposed Work Plan Sampling & Analysis Plan

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- 1 Vicinity Map
- 2 Aerial Site Map
- 3 Detailed Aerial Site Map

ATTACHMENTS

- 1 Project Summary Letter to the USEPA from KERAMIDA, dated October 8, 2009
- 2 Historical Aerial Photographs and Sanborn® Fire Insurance Maps
- 3 KERAMIDA Inc. Quality Management Plan, Revised October 2009
- 4 KERAMIDA Inc. Standard Operating Procedures
- 5 Site-Specific Health and Safety Plan
- 6 Pace Analytical Services, Inc. Quality Assurance Manual, Revision 12.0, March 27, 2009
- 7 Plume Maps Depicting Extent of Contaminant Occurrence Related to VRP Project Area
- 8 Proposed Project Schedule

**WABASH RIVER BANK COAL TAR MITIGATION WORK PLAN
FORMER WESTERN TAR FACILITY
2525 PRAIRIETON ROAD
TERRE HAUTE, INDIANA
KERAMIDA PROJECT NO. 13490**

1.0 INTRODUCTION

KERAMIDA Inc. (KERAMIDA) was contracted by Mr. Joseph B. Card, President and Owner of CAVU-Ops., Inc. (CAVU-Ops) to mitigate the presence of apparent coal tar materials identified on the east bank of the Wabash River adjacent to the former Western Tar facility, CAVU-Ops property, located at 2525 Prairieton Road, Terre Haute, Vigo County, Indiana (Site). The purpose of the Work Plan is to provide a description of the actions required to remediate apparent coal tar materials identified on the east bank of the Wabash River at the south end of the Site. KERAMIDA has developed this Work Plan in accordance with the Draft Administrative Settlement Agreement and Order on Consent for Removal Action (Agreed Order) between the U.S. Environmental Protection Agency (USEPA) and CAVU-Ops.

A Vicinity Map is presented as Figure 1 and shows the Site location and surrounding area. An Aerial Site Map depicting the Site boundaries is included as Figure 2. A Detailed Aerial Site Map depicting the approximate location of apparent coal tar seeps and other salient features is included as Figure 3.

1.1 SITE BACKGROUND

KERAMIDA was contracted by Mr. Card to investigate an anonymous reported presence of coal tar materials on the east bank of the Wabash River adjacent to the former Western Tar facility, CAVU-Ops property. Subsequent conversations between USEPA Region 5 representatives, Mr. Jeff Crawley and Ms. Verneta Simon, and KERAMIDA, indicated that the USEPA had responded to the anomalous report and confirmed apparent coal tar impacts along the east bank of the Wabash River. The USEPA directed KERAMIDA to collect water samples from the Wabash River both upstream and downstream from the apparent tar-impacted section of the river bank and additionally collect soil/material samples of the tar-impacted areas. Further direction was given to analyze the samples for compounds of potential concern (COPCs) including Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), and Polychlorinated Biphenyls (PCBs).

On July 13, 2009, KERAMIDA mobilized to the section of river bank in question to assess the reported impacts, mitigate any current potential impacts to the Wabash River, and collect river water and soil/material samples. Access to the river bank was gained via a boat on the Wabash River. River water samples and soil/material samples were collected. Apparent coal tar material was observed intermittently along an approximate 400 foot section of the river bank. In one location the material was in contact with the Wabash River. This material was moved with the use of a hand shovel to another accumulation of tar-impacted material.

Measurements and photographs of the coal tar material occurrences were taken in order to generate this work plan to mitigate the impacts. The northern and southern extent of observed impacts have the following coordinates:

Northern Extent - 39° 25' 58.81" N 87° 25' 47.56 W

Southern Extent - 39° 25' 55.34" N 87° 25' 48.94 W

KERAMIDA collected surface water samples from the Wabash River adjacent to the tar-impacted area and at upstream and downstream locations. Soil samples were also collected from sand that was beneath the tar-impacts and from dark soil located south of the tar-impacted area. COPCs were not detected in surface water samples collected from the Wabash River above the USEPA Superfund Ecotox Thresholds for Surface Water. COPCs were also not detected in the soil samples at concentrations exceeding the IDEM Risk Integrated System of Closure Residential Default Closure Levels (RDCLs) for soil.

KERAMIDA prepared and submitted a letter, dated October 8, 2009, to the USEPA summarizing pertinent corrective actions and a timeline of events completed to date regarding tar-impacts. A copy of the summary letter is included in Attachment 1.

1.2 SITE LOCATION AND HISTORY

The former Western Tar Corporation facility is located at 2525 Prairieton Road, Terre Haute, Vigo County, Indiana (Figures 1 through 3). The entire Site consists of approximately 22 acres located in the southeast quarter of the east half of Section 32 of Range 9 West, Township 12 North.

The Site has been a wood-treating facility since about 1906. CAVU Ops currently owns the property. Tangent Rail Corporation currently leases the property and operates the Site as a wood-treating facility.

Apparent coal tar materials subject to this Work Plan were identified on the east bank of the Wabash River at the south end of the Site. All wood-treatment operations have occurred at the north end of the Site. Historically, the south end of the Site has only been utilized for the storage of untreated railroad ties.

KERAMIDA completed a search of historical records, including aerial photographs and Sanborn® Fire Insurance Maps available through Environmental Data Resources, Inc. (EDR), to confirm past uses of the south end of the Site. The Sanborn® Fire Insurance Map coverage ended just south of the current process area. The available aerial photographs, however, confirm that no structures were present and no active wood treatment operations were conducted south of Interstate 70. Aerial photographs from 1952, 1972, 1977, 1984, 1987, 1992, 1998, 2005, and 2006 were available for review. Aerial photographs and Sanborn® Fire Insurance Maps available through EDR are provided in Attachment 2.

2.0 STATEMENT OF PURPOSE

KERAMIDA has developed this Work Plan in accordance with the Agreed Order between the USEPA and CAVU-Ops. The purpose of the Work Plan is to provide a description of the actions required to remediate apparent coal tar materials identified on the east bank of the Wabash River at the south end of the Site. Remediation activities included in the Work Plan have two distinct phases; 1) removal of primarily surficial impacts occurring from the river's edge to an approximate elevation of 20 feet above the river's edge, lower river bank, and 2) removal of over burden and underlying layer of visually tar-impacted material approximately four feet in thickness from the upper river bank. The four-foot layer appears to be the source of the surficial impacts at lower river bank. The goal of the remediation is to remove present and future potential impacts to the Wabash River.

3.0 COMPOUNDS OF POTENTIAL CONCERN

The COPCs based on knowledge of the material present and results of the initial sampling directed by the USEPA include the entire target list of SVOCs and VOCs in the USEPA SW-846 Methods 8270 and 8260, respectively, as listed below.

<u>SVOCs</u>	<u>VOCs</u>
Acenaphthene	Benzene
Acenaphthylene	Ethylbenzene
Anthracene	Toluene
Benzo (a) anthracene	Xylenes, Total
Benzo (a) pyrene	
Benzo (b) fluoranthene	
Benzo (ghi) perylene	
Benzo (k) fluoranthene	
2-Chloronaphthalene	
Chrysene	
Dibenzo (a,h) anthracene	
Fluoranthene	
Fluorene	
Indeno (1,2,3-cd) pyrene	
Naphthalene	
Phenanthrene	
Pyrene	

4.0 WORK PLAN

The procedures that will be used to perform the work detailed in the Agreed Order between the USEPA and CAVU-Ops are discussed in the following sections. All work will be completed in accordance with KERAMIDA's Quality Management Plan, revised October 2009, Attachment 3, and Standard Operating Procedures, Attachment 4.

4.1 PRE-FIELD ACTIVITIES

4.1.1 Health and Safety

KERAMIDA prepared a Site-specific health and safety plan (HASP), Attachment 5, for the investigation and removal activities. The HASP addresses the tasks, COPCs, and media. In addition, the KERAMIDA field manager will conduct a daily tailgate safety meeting with all field personnel prior to beginning field activities.

4.1.2 Underground Utilities

Prior to mobilization to the Site, KERAMIDA will contact Indiana Underground Plant Protection Services (Indiana 811) to mark all underground public utilities in the work area.

4.1.3 Construction, Erosion, and Sediment Control Plan

The planned mitigation activities do not appear to be subject to Rule 5 since disturbance of greater than one acre of land is not anticipated. However, since no Site characterization has been performed in this area, it is possible that the disturbed area may approach or exceed one acre. Based on previous communication with the City of Terre Haute Municipal Separate Storm Sewer System (MS4) representative, Marc Maurer, the City of Terre Haute will likely require a Construction, Erosion, and Sediment Control Plan (EC Plan) for the project. Mr. Maurer indicated that a Site visit by would be required for a final decision. If the City of Terre Haute requires an EC Plan, KERAMIDA would request assistance from the USEPA with obtaining a waiver for this requirement.

KERAMIDA plans to incorporate the critical elements of an EC Plan where appropriate to prevent sediment erosion in to the Wabash River. A reinforced silt fence will be installed along the lower river bank below the planned areas of excavation. Silt fencing will also be installed as appropriate and feasible locations in the upper river bank. The Site topography, however, will limit installation of silt fencing in the upper river bank areas. No other storm water management features are being installed to service this construction project.

Soil stockpiles will be evaluated and if placement will be near project boundaries, the soil piles will be surrounded by silt fence, covered with plastic sheeting, or stabilized to prevent erosion. A rip rap berm is located between the excavation and planned staging areas. The berm will divert runoff from entering excavations. Mulch will be applied to all disturbed areas upon which work has been completed. Care will be taken to prevent carryover of soils and or other pollutant sources onto the site access and egress roadways.

Following mitigation activities, the storm water quality measures utilized during construction will be left in place until exposed soils are stabilized. Refer to Section 4.6 for stabilization and post stabilization activities planned for the project.

4.2 SITE SECURITY

Chain link fencing surrounds the Site except to the west along the Wabash River. Due to the presence of the Wabash River and topography relief along the river, access to the Site from the west is extremely unlikely. As an added safety precaution, however, orange barrier fencing (snow fence) will be installed on the river bank at the northern and southern extents of the tar-impacted area to further restrict access to the work area. Orange barrier fencing and/or safety barricades will be utilized at the top of the river bank within the limits of the chain link fencing to restrict access by Tangent Rail Corporation employees or other Site workers not associated with coal tar removal activities. The chain link fencing is kept locked by Tangent Rail Corporation during non-business hours.

4.3 INVESTIGATION SAMPLING

4.3.1 Wabash River Sediment

The Agreed Order between the USEPA and CAVU-Ops requested sediment sampling of the Wabash River in designated locations for the presence of coal tar. On July 13, 2009, KERAMIDA removed apparent coal tar material observed to be in contact with the river water. KERAMIDA collected a sample of the sediment/sand below the tar and submitted it for analysis of COPCs including SVOCs, VOCs, and PCBs. COPCs were not detected in the sediment/soil sample at concentrations exceeding the IDEM RISC RDCLs for soil. KERAMIDA also completed subsequent removal activities of visible tar-impacted material, which was moveable by hand and/or hand tools, from the river level and lower river bank areas during the period of August 10-20, 2009. The July 13, 2009 sampling activities, sample location, and subsequent tar removal activities are detailed in the summary letter to USEPA, dated October 8, 2009, included in Attachment 1. No additional sampling of sediment in the Wabash River appears warranted, and therefore, is not planned during the project.

4.3.2 Soil Along East Property Line

KERAMIDA will complete three soil borings along the east property line, east of the tar-impacted area, using a Geoprobe[®] percussive rig. The borings will be advanced to a maximum depth of 16 feet below ground surface (bgs), groundwater, or boring refusal, whichever occurs first. The boring will be completed in general accordance with KERAMIDA Standard Operating Procedures (SOPs), Attachment 4. The proposed soil boring locations are depicted on Figure 3.

A continuous soil core will be extracted at four-foot intervals from each boring to obtain soil samples for soil texture identification, field screening, and laboratory analysis. Field screening activities will include screening with a flame ionization detector (FID) and a visual and olfactory inspection. Boring logs, describing field screening results and lithology, will be prepared and presented in the final Remediation Completion Report discussed in Section 5.0.

KERAMIDA will collect soil samples from the borings in accordance with Table 1: Proposed Work Plan Sampling & Analysis Plan (SAP). Appropriate quality assurance/quality control (QA/QC) samples will be collected in accordance with Table 1. Soil samples will be submitted for the analysis of SVOCs and VOCs listed in Section 3.0. The samples will be logged on a chain-of-custody form and submitted to Pace Analytical Services (Pace), Indianapolis, Indiana, a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory, through proper chain-of-custody procedures. Analytical methods used by Pace are provided at the end of Table 1. The analyses will be completed in accordance with the Pace Quality Assurance Manual, Revision 12.0, dated March 27, 2009, Attachment 6, using Level IV Data Quality Objectives (DQO). Table 1 summarizes the rationale for each proposed boring location, the associated soil sampling, and lab analyses.

4.3.3 Soil Northeast of Tar-Impacted Area

The Agreed Order between the USEPA and CAVU-Ops requested soil sampling be completed to the northeast of the tar-impacted area in the vicinity of the area enrolled in IDEM Voluntary Remediation Program (VRP) to determine whether the source of the coal tar is in the process area. Coal tar occurrence in the VRP project area, referred to as the process area, has been delineated horizontally through previous investigation activities completed under IDEM VRP oversight and does not extend south of Interstate 70 to the south end of the Site. Plume maps depicting the extent of representative COPC occurrence in soil and groundwater are presented in Attachment 7. No additional sampling to the northeast appears warranted, and therefore, is not planned during the project.

4.3.4 Soil East of Tar-Impacted Area

During a November 24, 2009 Site visit, USEPA recommended soil sampling be completed east of the tar-impacted area and east of the rip-rap berm to determine whether the source of the coal tar is from past operations conducted in the current untreated railroad tie storage area. Based on the south end of the Site only being used for the storage of untreated railroad ties, which is

confirmed by historical aerial photographs (Attachment 2), no sampling in this area appears warranted, and therefore, is not planned during the project.

4.4 RIVER LEVEL AND LOWER RIVER BANK CLEANUP

KERAMIDA completed removal activities of visible tar-impacted material, which was moveable by hand and/or hand tools, from the river level and lower river bank areas during the period of August 10-20, 2009. The material was walked or carted to a “lift area” where it was lifted in 55-gallon drums from the river level to the plant level at the top of the river bank with the use of a small crane. Most of the tar-impacted material removed from the lower river bank was placed on and covered with plastic sheeting in a staging area on the plant level. A small portion of the tar-impacted material was accumulated during removal activities at a point beyond the reach of the crane, and therefore, was placed on and covered with plastic sheeting at a second staging area on the lower river bank. The staging area is depicted on Figure 3. The river level and lower river bank cleanup activities are detailed in the summary letter to USEPA, dated October 8, 2009, included in Attachment 1.

The stockpiles of tar-impacted material will be removed from the staging areas and disposed of off-Site during the upper river bank cleanup detailed in Section 4.5. The material will be profiled and disposed of at Republic Industries Sycamore Ridge Landfill, Pimento, Indiana.

4.5 UPPER RIVER BANK CLEANUP

KERAMIDA subcontractor, HIS Constructors, LLC (HIS), Indianapolis, Indiana, will complete the upper river bank cleanup and disposal activities under the direct supervision of KERAMIDA personnel. The upper river bank cleanup activities are described in the following sections.

4.5.1 Grubbing and Ground Clearing

Vegetative cover necessary to access the visible tar-impacted material located on the upper river bank will be cleared. KERAMIDA anticipates three areas totaling 3,000 to 4,000 square feet will require clearing. Cleared vegetation will be chipped with a wood chipping machine and left on-Site. Chipped material and larger logs which cannot be chipped will be placed in the staging area and potentially utilized during the Site restoration activities detailed in Section 4.6.

4.5.2 Removal Activities

Prior to any excavation work, reinforced silt fence will be installed along the lower river bank (see Figure 3) below the work areas to protect against any material inadvertently rolling into the

river during the remediation. To minimize potential safety concerns and impacts to the Wabash River, HIS will utilize a long reach excavator set at the top of the river bank, on flat stable ground.

Utilizing a field spotter on the lower river bank, HIS will begin excavating overburden material (soil and vegetation) on the upper river bank directly above the approximate four-foot layer of the tar-impacted material. During excavation activities, un-impacted scrap steel will be separated for recycling and un-impacted railroad ties will be segregated for potential re-use during backfilling to increase bank stability. Clean overburden material will be stockpiled in a location for re-use as backfill. HIS will initiate removal of tar-impacted material at the western edge of the upper river bank. HIS will excavate the tar-impacted material and load directly into properly licensed trucks for off-Site disposal. If necessary, tar-impacted material will be stockpiled in the staging area on and covered with plastic for subsequent off-Site disposal. The tar-impacted material will be transported to and disposed of at Republic Industries Sycamore Ridge Landfill, Pimento, Indiana. Removal of tar-impacted material will continue until tar-impacted material is no longer visible or a distance of 25 feet east of the start of the removal, whichever is less. If tar-impacted material is observed at the 25-foot distance, then a physical barrier, such as thick plastic sheeting, will be placed next to the remaining tar-impacted material. KERAMIDA anticipates up to 250 tons of tar-impacted material, including current stockpiled material, will be removed and disposed of off-Site.

Following the removal of visible tar-impacted material from the upper-river bank, HIS will remove residual tar, fallen tar-impacted material, and staged material stockpiled on and covered with plastic sheeting from the lower river bank. A long reach excavator or crane will be utilized to lower a mini-excavator to the lower river bank to assist laborers with shovels to clean up the surficial impacts. After the surficial material is removed, the mini-excavator will be removed from the lower river bank in the same fashion that it was placed.

4.5 CONFIRMATION SAMPLE COLLECTION

Following removal activities, KERAMIDA will collect confirmatory soil samples from the excavated areas on the upper river bank. Confirmatory soil samples will be collected from the sidewalls and bottoms of the excavations. KERAMIDA will collect confirmatory soil samples from excavation sidewalls two feet or thicker and at a frequency of one per 20 linear feet. Samples will be collected from the excavation bottoms at a frequency of one per 400 square feet. Additionally, KERAMIDA will collect samples from overburden material to be returned to the

excavations as fill at an approximate rate of one per 50 cubic yards. KERAMIDA anticipates a total of 20 confirmatory samples will be collected during the project.

Confirmatory soil samples will be collected directly from the excavator bucket, operated by HIS personnel, using hands gloved with disposable nitrile gloves. Alternately, KERAMIDA may collect samples using a stainless steel hand spade. Soil samples will be placed into appropriate laboratory-supplied containers and placed on ice in a cooler for submittal of laboratory analysis. An uncontainerized portion of each sample will be field screened. Field screening activities will include screening with an FID and a visual and olfactory inspection. Confirmatory samples will be collected in general accordance with KERAMIDA SOPs, Attachment 4.

KERAMIDA will collect confirmatory soil samples in accordance with Table 1: Proposed Work Plan SAP. Appropriate QA/QC samples will be collected in accordance with Table 1. Soil samples will be submitted for the analysis of SVOCs and VOCs listed in Section 3.0. The samples will be logged on a chain-of-custody form and submitted to Pace through proper chain-of-custody procedures. Analytical methods used by Pace are provided at the end of Table 1. The analyses will be completed in accordance with the Pace Quality Assurance Manual, Revision 12.0, dated March 27, 2009, Attachment 6, using Level IV DQO. Table 1 summarizes the rationale for each proposed sample location, the associated soil sampling, and lab analyses.

4.6 BACKFILLING AND SITE RESTORATION

HIS will place up to 250 tons of imported pit run or similar material in the excavated areas. The imported fill materials will be covered with clean overburden removed during excavation. Fill soils placed on the ground surface will be cohesive material suitable for vegetation growth. HIS will compact the fill materials to the extent possible with the excavator bucket. Un-impacted railroad ties will be strategically placed to increase bank stability. Where possible, the final cover will be graded to ensure proper drainage. The final slope will be consistent with the existing slope. The wood mulch from chipping activities will then be placed over the disturbed area for erosion control. Previously fallen trees will also be strategically placed along the disturbed slope areas.

Following restoration activities, all safety fence and barricades will be removed from the Site. No added post-removal or long-term Site-control or security measures will be implemented.

5.0 REPORTING

Once analytical results have been received and the data packages screened for errors, KERAMIDA will prepare a Remediation Completion Report. The report will include maps, description of field activities, discussion of the analytical results, conclusions, and recommendations. Additionally, the data packages, waste disposal documentation, photo documentation, and other pertinent information will be included. The report will be submitted to the USEPA within 60 calendar days after completion of all work to be performed per the Agreed Order between the USEPA and CAVU-Ops.

6.0 SCHEDULE

The proposed schedule to perform the work detailed in the Agreed Order between the USEPA and CAVU-Ops is presented in Attachment 8.

TABLES

Table 1
Proposed Work Plan Sampling and Analysis Plan
Former Western Tar Facility
2525 Prairieton Road
Terre Haute, Indiana
KERAMIDA Project No. 13490

No. of Borings/ Samples	Location Rational	Method	Anticipated Depth (ft)	Soil		
				Sample Depth (ft)	Sampling Rational	Lab Analyses
3	Along East Property Line	Push-Probe	16	TBD	Field Observations – Maximum FID and/or Visual Tar	BTEX, SVOCs
4	Quality Assurance/ Quality Control Investigation Soil Samples / Trip Blank	Push-Probe	16	TBD	Duplicate, Matrix Spike, Matrix Spike Duplicate Soil Samples – Trip Blank	BTEX*, SVOCs
6	Excavation Bottom	Grab	2-4	TBD	One Sample Per 400 Square Feet	BTEX, SVOCs
12	Excavation Sidewalls	Grab	1-2	TBD	One Sample Per 20 Linear Feet	BTEX, SVOCs
3	Overburden Material to Be Returned as Fill	Composite	NA	NA	One Per 50 Cubic Yards	BTEX, SVOCs
6	Quality Assurance/ Quality Control Confirmatory Soil Samples / Trip Blanks	Grab	1-4	TBD	Duplicate, Matrix Spike, Matrix Spike Duplicate Soil Samples	BTEX*, SVOCs

FID = Flame Ionization Detector
ft = Feet

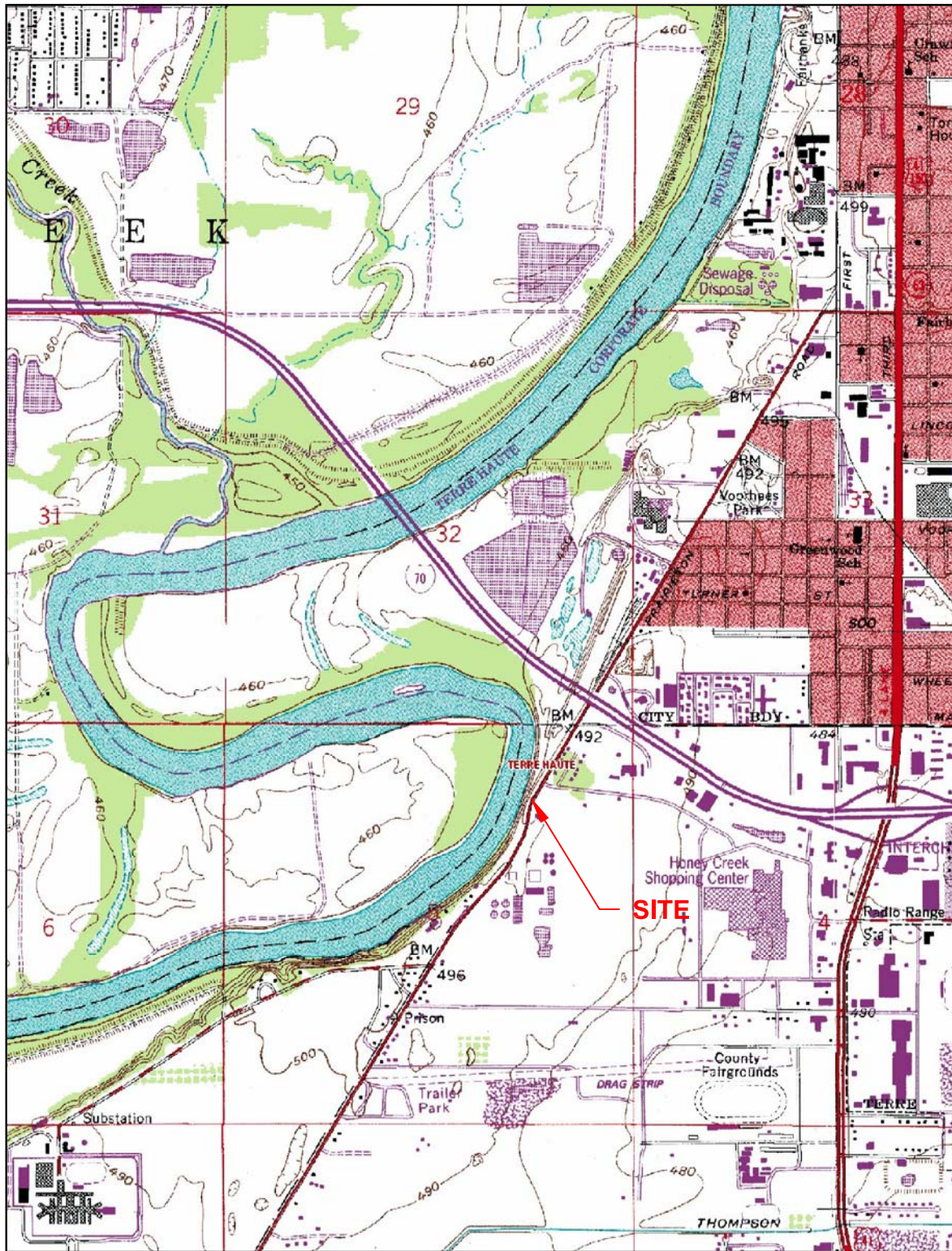
NA = Not Applicable
TBD = To Be Determined

BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes; U.S. EPA SW846 Method 8260B / 5035

SVOCs = Semi-Volatile Organic Compounds; U.S. EPA SW846 Method 8270C/8270C SIM

*Only analysis for trip blanks

FIGURES



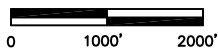
NORTH



INDIANA



SCALE: 1" = 2000'



REF: USGS 7.5 MINUTE SERIES
INDIANA-TERRE HAUTE QUADRANGLE



KERAMIDA
Global EHS & Sustainability Services

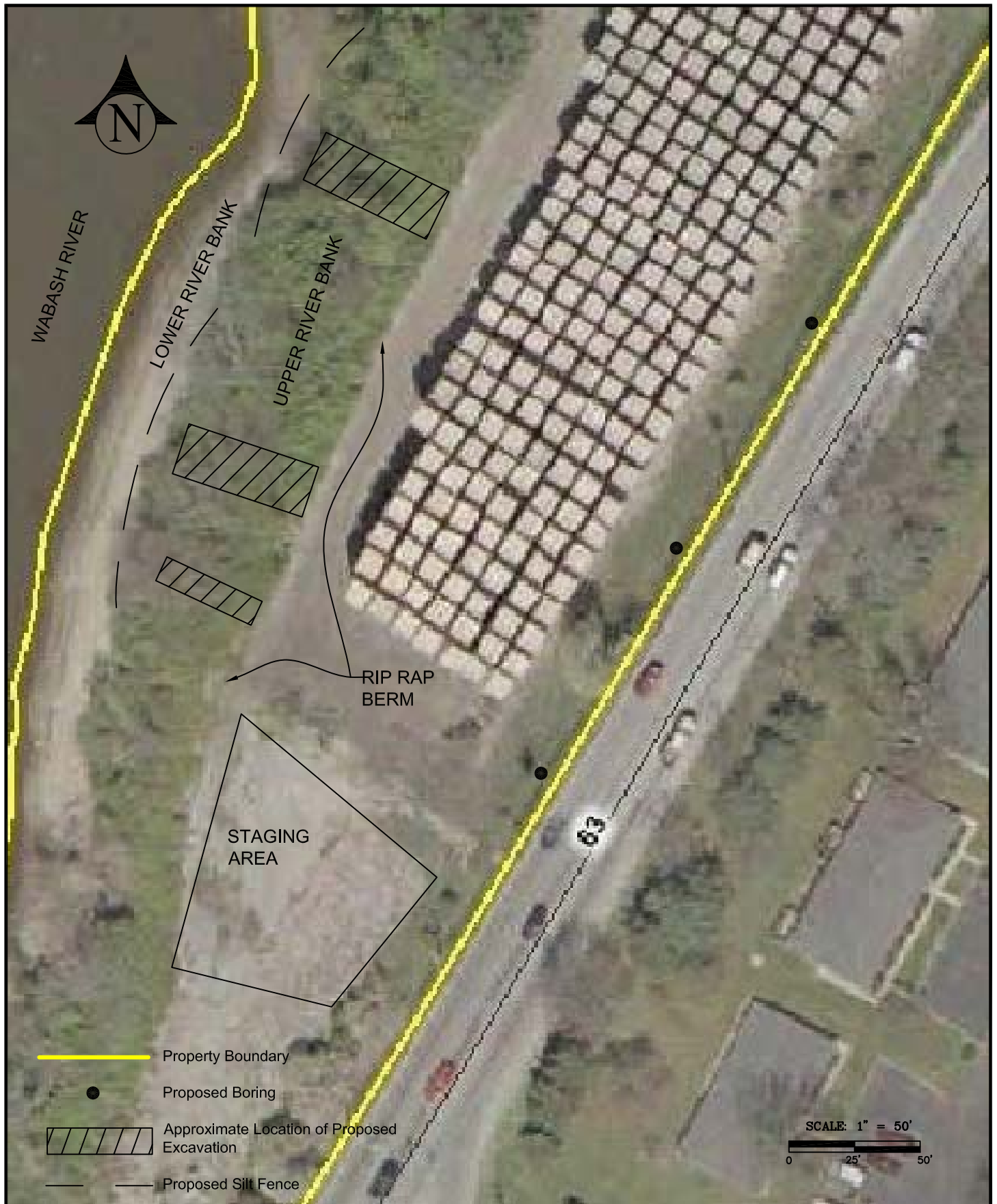
Project: Former Western Tar Facility
2525 Prairieton Road
Terre Haute, Indiana

Project Number: 13490
Date: November 23, 2008

Drawn By: J.CLARK
Approved By: BEH
File No. CavuOpsWab

Figure 1

Site Vicinity Map



KERAMIDA
A Global EHS Services Provider

Project: Former Western Tar Facility
2525 Prairieton Road
Terre Haute, Indiana

	Drawn By: J.CLARK
Project Number: 13490	Approved By: BEH
Date: November 23, 2009	File No. CavuOpsWab

Figure 3

Detail Site Map

ATTACHMENT 1



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October 8, 2009

Verneta Simon
On-Scene Coordinator
U.S. EPA Region V
Emergency Response Branch II, Response Section III
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Chicago, IL 60604

Re: Cavu-Ops, Inc.
Portion of Property along the Wabash River
Former Western Tar Products Site
Terre Haute, Vigo County, Indiana

Dear Ms. Simon:

KERAMIDA Inc. (KERAMIDA) has been retained by Cavu-Ops, Inc. as their environmental contractor in the above referenced matter to address environmental impacts recently discovered along the southern portion of the property adjacent to the Wabash River. The purpose of this letter is to establish a timeline of events regarding the impacts on this portion of the property, and to convey and document the actions that KERAMIDA, by direction of Cavu-Ops, has taken to respond to and mitigate these impacts. The following timeline is KERAMIDA's understanding of the order of events regarding this matter.

Summary and Time Line of Pertinent Actions Regarding Environmental Impacts along the Wabash River Portion of Cavu-Ops, Inc. Property, Terre Haute, IN

- 6/29/09 An anonymous fisherman called the Indiana Department of Environmental Management (IDEM) and reported that black material was seeping from the banks of the Wabash River into the river.
- 7/7/09 U.S. EPA On-Scene Coordinator (OSC) Jeff Crowley and representatives, led by Jason Sewell, of the Indiana Department of Environmental Management (IDEM) responded to the report. Their response consisted of taking a boat out onto the Wabash River in the general vicinity of the reported release and making observations from the river. Neither IDEM nor U.S. EPA requested access to the Site during the investigation. OSC Crowley reported that from his vantage point in a boat on the Wabash River he saw black material seeping from the 20- to 40-foot high river bank that forms the western edge of the Site into the Wabash River. Furthermore, he stated that the black material was located several feet beneath the surface grade of the Site and interspersed intermittently along an

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approximately 400-hundred foot section of the eastern bank of the Wabash River. The black material was also located on the lower banks of the Wabash River and was seen seeping directly into the Wabash River.

- 7/9/09 Joe Card, owner of Cavu-Ops, Inc., was informally made aware of the site visit of the USEPA and the IDEM and the corresponding reported impacts. Mr. Card contacted KERAMIDA to represent Cavu-Ops in this matter as their environmental contractor and to investigate and address these reported impacts.
- 7/9/09 KERAMIDA contacted OSC Crawley and received more detailed information regarding observations made during the site visit. OSC Crawley stated that Verneta Simon was the USEPA Region V on-scene coordinator assigned to this project.
- 7/10/09 KERAMIDA contacted Verneta Simon and discussed a reconnaissance visit by KERAMIDA to the site. Ms. Simon requested that river water and beach soil samples be collected during the site reconnaissance.
- 7/13/09 KERAMIDA mobilized to the site, and accessed the reportedly impacted portion of the property along the Wabash River by boat. The impacts consisted of a tar seep in one location that extended to the river. KERAMIDA immediately removed the portion of the tar seep from contact with the river. Coal tar is a solid under normal atmospheric temperatures and pressures, and only is mobile when temperatures, direct sunlight, and gravity (a steep enough slope), work together to allow it to slowly move downslope. Because of these properties of coal tar material, removing the material from contact from the river by hand and assuring that it would not contact the river until further remedial efforts could be planned, was a simple task. KERAMIDA also collected river water samples from the river adjacent to the impacted area and both up and downstream from that area. A soil sample was also taken from sand that was beneath the tar seep impacts.

The northern and southern extent of observed impacts have the following coordinates: Northern Extent - 39° 25' 58.81" N 87° 25' 47.56 W
Southern Extent - 39° 25' 55.34" N 87° 25' 48.94 W

Lab Results for Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), and Polychlorinated Biphenols (PCBs) were summarized and submitted to Verneta Simon in July 2009 and did not indicate any compounds present above applicable IDEM cleanup guidelines. The summary table and lab results are attached to this document.

- 7/22/09 The Workplan to Mitigate Coal Tar Impacts along the Wabash River and the associated Health and Safety Plan was submitted to Verneta Simon. KERAMIDA scheduled to mobilize to site on August 3, 2009. Verneta Simon suggested a later date to allow for some necessary administrative functions to occur. August 10, 2009 was agreed upon for a mobilization date.
- 7/27-30/09 KERAMIDA made calls to the Army Corps of Engineers in Indianapolis. The Corps confirmed that unless we were working in or above the normal river channel that they did not have jurisdiction and did not require any permits. They stated that IDNR had the jurisdiction of the beach area.
- KERAMIDA made calls to IDNR requesting information regarding required permits. It was stated that hand removal of material would not require a permit but that IDNR would need to be informed of the activity. Also, any activity requiring heavy equipment or actual excavation would require a permit.
- 8/10/09 KERAMIDA informed IDNR of plans to remove coal tar impacts by hand and with use of hand tools.
- 8/10/09 KERAMIDA mobilized to site to remove coal tar impacts that were able to be removed by hand and with hand tools. The material was walked or carted to the "lift area" where it was lifted in 55 gallon drums from the river level to the plant level, at the top of the river bank, with the use of a small crane.
- 8/10-20/09 KERAMIDA removed material from along the river to a staging area on the plant level. Photo documentation of the removal activities are attached.
- 9/25/09 A letter from IDNR was received by KERAMIDA that stated a permit was not necessary to remove material by hand or with hand tools. Furthermore, it was stated that excavation of material with the use of heavy equipment would require a IDNR permit. A copy of the letter is attached.
- Current The appropriate IDNR permit is being completed in order to allow excavation of the coal tar material that remains on site.
- The Agreed Order is in final negotiations between EPA and Cavu-Ops. When the Order is executed, further mitigation of coal tar impacts on the river bank will commence.

Ms. Verneta Simon
USEPA Region V
Wabash River Portion of
Former Western Tar Property
Terre Haute, IN
Page 4

It has been a pleasure working with you to most efficiently address these issues. If you have questions or need additional information please do not hesitate to call me at (317) 685-8230 or (317) 697-4815 or contact Andy Gremos at (317) 685-6600.

Sincerely,
KERAMIDA Inc.

A handwritten signature in cursive script, appearing to read "Scott Randall".

Scott Randall, L.P.G., C.H.M.M.
Senior Project Manager

A handwritten signature in cursive script, appearing to read "Andrew Gremos".

Andrew Gremos, L.P.G., C.H.M.M.
Senior Vice President

Photographic Documentation




Wabash River Beach Impacts and Clean Up-Site Photographs

Before and After Photos of impacted areas.	Cavu-Ops Riverside Property-Terre Haute, IN
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<p>Description</p> <p>1. Photo of tar seep on July 13, 2009-Keramida's first visit to impacted beach(left) and after the beach cleanup on August 20, 2009(right).</p>	
--	---

<p>Description</p> <p>2. Photo of tar seep contacting the Wabash River on July 13, 2009-Keramida's first visit to impacted beach(left) and after the beach cleanup on August 20, 2009(right).</p>	
--	--

Wabash River Beach Impacts and Clean Up-Site Photographs

Before and After Photos of impacted areas.	Cavu-Ops Riverside Property-Terre Haute, IN	
Description		
<p>3. Photo of old wooden barrels filled with coal tar (high on bank) upper left and some removal activities of the barrels (lower right).</p>	 <p>13/01</p>	
<p>4. Photo of hard coal tar material that is falling out of bank and adding to the below shown debris field in plate 5. The impacts in the river bank wall will require excavation after IDNR permit approval is recieved.</p>		
	 <p>13/07/2009</p>	

Wabash River Beach Impacts and Clean Up-Site Photographs

Before and After Photos of impacted areas.	Cavu-Ops Riverside Property-Terre Haute, IN	
<p>Description</p> <p>5. Photo of coal tar debris field fed by material shown in plate 4 on 8/11/09 (left) and same area after clean up on August 20, 2009(right).</p>		
<p>Description</p> <p>6. Photo of typical coal tar debris found along beach.</p>		

Removal Actions	Cavu-Ops Riverside Property-Terre Haute, IN
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<p>Description</p> <p>1. Keramida Workers picking coal tar material up by hand and loading onto wagons for transport to lift area. (Week of August 10, 2009)</p>	
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<p>Description</p> <p>2. Keramida workers loading coal tar materials on wagon (left) and moving wagon to lifting area (right) - Week of August 10, 2009.</p>	
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Removal Actions	Cavu-Ops Riverside Property-Terre Haute, IN

Description

3. Photographs showing the method of lifting coal tar material from the beach level to the Plant Level (top of River Bank). Material was placed in 55-gallon drums and lifted with a small crane. Occasionally large pieces were rigged directly (far right). Week of August 10, 2009.



Description

4. Photographs showing the small crane being utilized to move the material and a transport drum in mid lift. (Week of August 10, 2009)



Removal Actions	Cavu-Ops Riverside Property-Terre Haute, IN	
<p>Description</p> <p>5. Crane in action and the coal tar material stockpile starting to accumulate. (8/13/09)</p>	 	 
<p>6. Typical load of coal tar material on wagon used to move material to lift area (left), material being removed from beach with a pick axe (bottom right), and other material being carried by hand (top right) (8/13/09).</p>		 

IDNR Approval for Work Letter

MAILED SEP 25 2009

DNR

Indiana Department of Natural Resources

Mitchell E. Daniels, Jr., Governor
Robert E. Carter JR, Director
Division of Water
402 West Washington Street
Room W264
Indianapolis, IN 46204-2641
Phone (317) 232-4160
Toll-free (877) 928-3755
Fax (317) 233-4579
www.in.gov/dnr/water/

September 24, 2009

Basin 16

RECEIVED
SEP 28 2009

KERAMIDA

Scott Randell, LPG, CHMM
Keramida Environmental Inc
401 North College Av
Indianapolis, IN 46202-3605

Re: CTS-2694
Wabash River, Vigo County

Dear Mr. Randell:

This is in response to a request received on August 10, 2009 for a Department review of a proposed project to remove coal tar deposits on the surface of the east bank of the Wabash River. The material will be removed using handheld tools. Based on your description, the project lies in the W $\frac{1}{2}$, NE $\frac{1}{4}$, NE $\frac{1}{4}$ of Section 5, Township 11N, Range 9W, and is located along the east bank of the river approximately 1800' east and 1800' south of the intersection of I-70 and State Road 63 extending upstream 400' near Terre Haute, Honey Creek Township, Vigo County.

The Department staff has determined that approval of the Department of Natural Resources is not required if the material is removed using only hand-held tools. No heavy equipment should be utilized in the removal of materials from the floodway without a permit from the Department of Natural Resources.

The conditions listed below must be met:

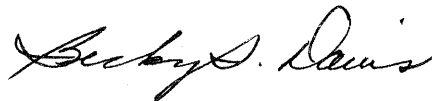
- 1) equipment used for the proposed project must only consist of portable machinery and hand tools
- 2) remove all construction debris from the floodway upon completion of the project
- 3) there must be no disturbance of existing land grades, stream bottom, or banks
- 4) obtain prior written approval from the Department for any additional construction, excavation or filling in or on the floodway beyond the scope of this project

This letter should be displayed at the project site. The Division of Water will place a copy of this letter in the file to be retained as a permanent record.

You should not construe this letter as a local building permit, nor is it a waiver of the provisions of any local building or zoning ordinances. Additionally, this letter does not relieve you of the responsibility of obtaining permits, approvals, easements, etc. as required by other federal, state and local agencies.

Thank you for this opportunity to be of assistance; your interest in providing safe floodplain development is appreciated. If you have any questions regarding this letter, please contact me, at 317-234-1073 or (toll free) 877-928-3755.

Sincerely,

A handwritten signature in black ink, appearing to read "Becky S. Davis". The signature is fluid and cursive, with the first name "Becky" being more prominent.

Becky S. Davis, CFM
Sr Environmental Manager
Division of Water

pc: Richard Harris – IDEM VRP Section Chief
Corey Webb – IDEM Office of Land Quality
Bill Hayes – IDEM Office of Land Quality RISC
Kristy McIntire – IDEM Office of Land Quality Chemistry

Summary of Analytical Results

Table 1
River Water Analytical Results (ug/L)
Former Western Tar Facility
Terre Haute, Indiana

Sample No.	Date Sampled	Lab Sample No.	Benzene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a) anthracene	Benz(a) pyrene	2-Chloronaphthalene	Chrysene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	Polychlorinated Biphenyls (PCBs)
Upstream#1 Fairbanks Pave	7/13/09	9-10000	< 5	< 1.0	< 1.0	< 0.1	< 0.1	< 0.1	< 10	< 0.1	< 1.0	< 1.0	< 0.022	< 1.0	< 1.0	< 1.0	< 0.5
Upstream#2 Near Impacts	7/13/09	9-10001	< 5	1.13	< 1.0	< 0.1	< 0.1	< 0.1	< 10	< 0.1	< 1.0	< 1.0	< 0.022	< 1.0	< 1.0	1.06	< 0.5
Downstream	7/13/09	9-10002	< 5	< 1.0	< 1.0	< 0.1	< 0.1	< 0.1	< 10	< 0.1	< 1.0	< 1.0	< 0.022	< 1.0	< 1.0	< 1.0	< 0.5
USEPA Superfund Ecotox Thresholds - Surface Water ⁽¹⁾																	
			46	23	4,840 ⁽³⁾	0.035 ⁽³⁾	0.025 ⁽³⁾	0.014	0.396 ⁽³⁾	NA	8.1	3.9	4.31 ⁽³⁾	24	6.3	0.3 ⁽³⁾	0.19
RISC Default Closure Level - Residential Groundwater ⁽²⁾																	
			5	460	71	43	1.2	0.20	610	1.6	210	310	1.2	8.3	23	140	0.5
RISC Default Closure Level - Industrial Groundwater ⁽²⁾																	
			52	4,200	730	43	3.9	0.39	8,200	1.6	210	2,000	3.9	2,000	310	140	1.4

Samples analyzed using EPA SW-846 Method 8260, 8270, and 8082.

NA = Not Available

ug/L = micrograms per liter

⁽¹⁾ U.S. Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response, Eco Update, January 1996

⁽²⁾ Indiana Department of Environmental Management RISC Technical Guide, Final, February 15, 2001 and including updates through May 1, 2009.

⁽³⁾ USEPA, Region 5, RCRA Ecological Screening Levels, August 22, 2003.

Table 2
Soil / Material Analytical Results (mg/kg)
Former Western Tar Facility
Terre Haute, Indiana

Sample No.	Date Sampled	Lab Sample No.	Benzene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	2-Chloronaphthalene	Chrysene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	Polychlorinated Biphenyls (PCBs)
Dark Soil - South of Tar Flow	7/13/09	9-10004	<0.006	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.34	<0.37	<0.08
Soil Directly Under Tar Flow	7/13/09	9-10005	<0.006	1.39	1.48	4.16	<0.35	1.2	2.85	12.7	0.72	1.27	<0.35	5.41	8.17	<0.08
RISC Default Closure Level - Residential ⁽¹⁾			0.034	18	51	5.0	0.50	42	25	880	170	3.1	0.7	13	570	1.8
RISC Default Closure Level - Industrial ⁽¹⁾			0.35	180	51	15	1.5	560	25	880	1,100	3.1	170	170	570	5.3

Samples analyzed using EPA SW-846 Method 8260, 8270, and 8082

mg/kg = milligrams per kilogram

⁽¹⁾ Indiana Department of Environmental Management RISC Technical Guide, Final, February 15, 2001, with updates through May 2009.

Laboratory Results



ENVision Laboratories, Inc.
1439 Sadlier Circle West Drive
Indianapolis, IN 46239
Tel: 317.351.8632
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www.envisionlaboratories.com

Mr. Scott Randall
Keramida Environmental , Inc.
401 North College Avenue
Indianapolis, IN 46202

July 27, 2009

ENVision Project Number: 2009-1424
Client Project Name: 3268B / Cavu-Ops Wabash

Dear Mr. Randall,

Please find the attached analytical report for the samples received July 15, 2009. All test methods performed were fully compliant with local, state, and federal EPA methods unless otherwise noted. The project was analyzed as requested on the enclosed chain of custody record. Please review the comments section for additional information about your results or Quality Control data. TCLP analyses is not included in NELAC certification.

Feel free to contact me if you have any questions or comments regarding your analytical report or service.

Thank you for your business. ENVision Laboratories looks forward to working with you on your next project.

Yours Sincerely,

A handwritten signature in black ink that reads 'Cheryl A. Crum'.

Cheryl A. Crum

Director of Project Management
ENVision Laboratories, Inc.

IL ELAP / NELAC Accreditation # 100454





Analytical Report

ENVision Laboratories, Inc.
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Indianapolis, IN 46239
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Fax: 317.351.8639
www.envisionlaboratories.com

Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: 8260

Prep Method: 5030B

Analytical Batch: 071809vw

Client Sample ID: UPSTREAM #1 FAIRBANKS
Envision Sample Number: PAVE

Sample Matrix: 9-10000
water

Sample Collection Date/Time: 7/13/09 11:45

Sample Received Date/Time: 7/15/09 16:28

<u>Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Acetone	< 100	100	
Acrolein	< 100	100	
Acrylonitrile	< 100	100	
Benzene	< 5	5	
Bromobenzene	< 5	5	
Bromochloromethane	< 5	5	
Bromodichloromethane	< 5	5	
Bromoform	< 5	5	
Bromomethane	< 5	5	
n-Butanol	< 50	50	
2-Butanone (MEK)	< 10	10	
n-Butylbenzene	< 5	5	
sec-Butylbenzene	< 5	5	
tert-Butylbenzene	< 5	5	
Carbon Disulfide	< 5	5	
Carbon Tetrachloride	< 5	5	
Chlorobenzene	< 5	5	
Chloroethane	< 5	5	
2-Chloroethylvinylether	< 50	50	
Chloroform	< 5	5	
Chloromethane	< 5	5	
2-Chlorotoluene	< 5	5	
4-Chlorotoluene	< 5	5	
1,2-Dibromo-3-chloropropane	< 5	5	
Dibromochloromethane	< 5	5	
1,2-Dibromoethane (EDB)	< 5	5	
Dibromomethane	< 5	5	
1,2-Dichlorobenzene	< 5	5	
1,3-Dichlorobenzene	< 5	5	
1,4-Dichlorobenzene	< 5	5	
trans-1,4-Dichloro-2-butene	< 100	100	
Dichlorodifluoromethane	< 5	5	



Analytical Report

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8260 continued...

<u>Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
1,1-Dichloroethane	< 5	5	
1,2-Dichloroethane	< 5	5	
1,1-Dichloroethene	< 5	5	
cis-1,2-Dichloroethene	< 5	5	
trans-1,2-Dichloroethene	< 5	5	
1,2-Dichloropropane	< 5	5	
1,3-Dichloropropane	< 5	5	
2,2-Dichloropropane	< 5	5	
1,1-Dichloropropene	< 5	5	
cis-1,3-Dichloropropene	< 5	5	
trans-1,3-Dichloropropene	< 5	5	
Ethylbenzene	< 5	5	
Ethyl methacrylate	< 100	100	
Hexachloro-1,3-butadiene	< 5	5	
n-Hexane	< 10	10	
2-Hexanone	< 10	10	
Iodomethane	< 10	10	
Isopropylbenzene (Cumene)	< 5	5	
p-Isopropyltoluene	< 5	5	
Methylene chloride	< 5	5	
4-Methyl-2-pentanone (MIBK)	< 10	10	
Methyl-tert-butyl-ether	< 5	5	
Naphthalene	< 5	5	
n-Propylbenzene	< 5	5	
Styrene	< 5	5	
1,1,1,2-Tetrachloroethane	< 5	5	
1,1,2,2-Tetrachloroethane	< 5	5	
Tetrachloroethene	< 5	5	
Toluene	< 5	5	
1,2,3-Trichlorobenzene	< 5	5	
1,2,4-Trichlorobenzene	< 5	5	
1,1,1-Trichloroethane	< 5	5	
1,1,2-Trichloroethane	< 5	5	
Trichloroethene	< 5	5	
Trichlorofluoromethane	< 5	5	
1,2,3-Trichloropropane	< 5	5	
1,2,4-Trimethylbenzene	< 5	5	
1,3,5-Trimethylbenzene	< 5	5	
Vinyl acetate	< 10	10	
Vinyl chloride	< 2	2	
Xylene, M&P	< 5	5	
Xylene, Ortho	< 5	5	
Xylene (Total)	< 10	10	
Dibromofluoromethane (surrogate)	96%		
1,2-Dichloroethane-d4 (surrogate)	83%		
Toluene-d8 (surrogate)	99%		
4-bromofluorobenzene (surrogate)	92%		
Analysis Date/Time:	07-18-09/04:16		
Analyst Initials	tjg		

Your Projects. Our Passion.



Analytical Report

ENVision Laboratories, Inc.
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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: 8270 BNA/PAH-SIM

Prep Method: 3520C

BNA Analytical Batch: 072009B

Client Sample ID: UPSTREAM #1 FAIRBANKS PAVE

Envision Sample Number: 9-10000

Sample Matrix: water

Sample Collection Date/Time: 7/13/09 11:45

Sample Received Date/Time: 7/15/09 16:28

<u>BNA Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Aniline	< 10	10	
Benzoic Acid	< 50	50	
Benzyl Alcohol	< 20	20	
4-Bromophenylphenyl ether	< 10	10	
Butylbenzylphthalate	< 10	10	
Carbazole	< 20	20	
4-Chloro-3-methylphenol	< 20	20	
4-Chloroaniline	< 20	20	
bis(2-Chloroethoxy)methane	< 10	10	
bis(2-Chloroethyl)ether	< 10	10	
bis(2-Chloroisopropyl)ether	< 10	10	
2-Chloronaphthalene	< 10	10	
2-Chlorophenol	< 10	10	
4-Chlorophenylphenyl ether	< 10	10	
Dibenzofuran	< 10	10	
1,2-Dichlorobenzene	< 10	10	
1,3-Dichlorobenzene	< 10	10	
1,4-Dichlorobenzene	< 10	10	
3,3-Dichlorobenzidine	< 20	20	
2,4-Dichlorophenol	< 10	10	
Diethylphthalate	< 10	10	
2,4-Dimethylphenol	< 10	10	
Dimethylphthalate	< 10	10	
Di-n-butylphthalate	< 10	10	
4,6-Dinitro-2-methylphenol	< 50	50	
2,4-Dinitrophenol	< 50	50	
2,4-Dinitrotoluene	< 10	10	
2,6-Dinitrotoluene	< 10	10	
Di-n-octylphthalate	< 10	10	
bis(2-Ethylhexyl)phthalate	< 5	5	
Hexachloro-1,3-butadiene	< 10	10	
Hexachlorobenzene	< 5	5	
Hexachlorocyclopentadiene	< 25	25	
Hexachloroethane	< 10	10	



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Analytical Report

8270 Continued...

<u>Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Isophorone	< 10	10	
2-Methylphenol (o-Cresol)	< 10	10	
3&4-Methylphenol	< 20	20	
2-Nitroaniline	< 50	50	
3-Nitroaniline	< 50	50	
4-Nitroaniline	< 50	50	
Nitrobenzene	< 10	10	
2-Nitrophenol	< 10	10	
4-Nitrophenol	< 50	50	
N-Nitroso-di-n-propylamine	< 10	10	
N-Nitrosodiphenylamine	< 10	10	
Pentachlorophenol	< 50	50	
Phenol	< 10	10	
1,2,4-Trichlorobenzene	< 10	10	
2,4,5-Trichlorophenol	< 10	10	
2,4,6-Trichlorophenol	< 10	10	
2-Fluorophenol (surrogate)	76%		
Phenol-d6 (surrogate)	86%		
Nitrobenzene-d5 (surrogate)	95%		
2-Fluorobiphenyl (surrogate)	66%		
2,4,6-Tribromophenol (surrogate)	41%		
p-Terphenyl-d14 (surrogate)	27%		
Analysis Date/Time:	07-20-09/12:34		
Analyst Initials:	gjd		
Date Extracted:	7/16/2009		
Initial Sample Volume:	1000 mL		
Final Volume:	1.0 mL		

PAH-SIM Analytical Batch: 072009P

<u>PAH-SIM Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Acenaphthene	< 1.0	1.0	
Acenaphthylene	< 1.0	1.0	
Anthracene	< 0.10	0.10	
Benzo(a)anthracene	< 0.10	0.10	
Benzo(a)pyrene	< 0.10	0.10	
Benzo(b)fluoranthene	< 0.10	0.10	
Benzo(g,h,i)perylene	< 0.10	0.10	
Benzo(k)fluoranthene	< 0.10	0.10	
Chrysene	< 0.10	0.10	
Dibenzo(a,h)anthracene	< 0.10	0.10	
Fluoranthene	< 1.0	1.0	
Fluorene	< 1.0	1.0	
Indeno(1,2,3-cd)pyrene	< 0.022	0.022	
2-methylnaphthalene	< 1.0	1.0	
Naphthalene	< 1.0	1.0	
Phenanthrene	< 1.0	1.0	
Pyrene	< 1.0	1.0	

Analysis Date/Time: 07-20-09/09:57

Analyst Initials

gjd

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Analytical Report

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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: 8260

Prep Method: 5030B

Analytical Batch: 071809VW

Client Sample ID: UPSTREAM #2 NEAR
IMPACTS

Envision Sample Number: 9-10001

Sample Matrix: water

Sample Collection Date/Time: 7/13/09

Sample Received Date/Time: 7/15/09 16:28

<u>Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Acetone	< 100	100	
Acrolein	< 100	100	
Acrylonitrile	< 100	100	
Benzene	< 5	5	
Bromobenzene	< 5	5	
Bromochloromethane	< 5	5	
Bromodichloromethane	< 5	5	
Bromoform	< 5	5	
Bromomethane	< 5	5	
n-Butanol	< 50	50	
2-Butanone (MEK)	< 10	10	
n-Butylbenzene	< 5	5	
sec-Butylbenzene	< 5	5	
tert-Butylbenzene	< 5	5	
Carbon Disulfide	< 5	5	
Carbon Tetrachloride	< 5	5	
Chlorobenzene	< 5	5	
Chloroethane	< 5	5	
2-Chloroethylvinylether	< 50	50	
Chloroform	< 5	5	
Chloromethane	< 5	5	
2-Chlorotoluene	< 5	5	
4-Chlorotoluene	< 5	5	
1,2-Dibromo-3-chloropropane	< 5	5	
Dibromochloromethane	< 5	5	
1,2-Dibromoethane (EDB)	< 5	5	
Dibromomethane	< 5	5	
1,2-Dichlorobenzene	< 5	5	
1,3-Dichlorobenzene	< 5	5	
1,4-Dichlorobenzene	< 5	5	
trans-1,4-Dichloro-2-butene	< 100	100	
Dichlorodifluoromethane	< 5	5	



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8260 continued...

<u>Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
1,1-Dichloroethane	< 5	5	
1,2-Dichloroethane	< 5	5	
1,1-Dichloroethene	< 5	5	
cis-1,2-Dichloroethene	< 5	5	
trans-1,2-Dichloroethene	< 5	5	
1,2-Dichloropropane	< 5	5	
1,3-Dichloropropane	< 5	5	
2,2-Dichloropropane	< 5	5	
1,1-Dichloropropene	< 5	5	
cis-1,3-Dichloropropene	< 5	5	
trans-1,3-Dichloropropene	< 5	5	
Ethylbenzene	< 5	5	
Ethyl methacrylate	< 100	100	
Hexachloro-1,3-butadiene	< 5	5	
n-Hexane	< 10	10	
2-Hexanone	< 10	10	
Iodomethane	< 10	10	
Isopropylbenzene (Cumene)	< 5	5	
p-Isopropyltoluene	< 5	5	
Methylene chloride	< 5	5	
4-Methyl-2-pentanone (MIBK)	< 10	10	
Methyl-tert-butyl-ether	< 5	5	
Naphthalene	< 5	5	
n-Propylbenzene	< 5	5	
Styrene	< 5	5	
1,1,1,2-Tetrachloroethane	< 5	5	
1,1,2,2-Tetrachloroethane	< 5	5	
Tetrachloroethene	< 5	5	
Toluene	< 5	5	
1,2,3-Trichlorobenzene	< 5	5	
1,2,4-Trichlorobenzene	< 5	5	
1,1,1-Trichloroethane	< 5	5	
1,1,2-Trichloroethane	< 5	5	
Trichloroethene	< 5	5	
Trichlorofluoromethane	< 5	5	
1,2,3-Trichloropropane	< 5	5	
1,2,4-Trimethylbenzene	< 5	5	
1,3,5-Trimethylbenzene	< 5	5	
Vinyl acetate	< 10	10	
Vinyl chloride	< 2	2	
Xylene, M&P	< 5	5	
Xylene, Ortho	< 5	5	
Xylene (Total)	< 10	10	
Dibromofluoromethane (surrogate)	98%		
1,2-Dichloroethane-d4 (surrogate)	84%		
Toluene-d8 (surrogate)	103%		
4-bromofluorobenzene (surrogate)	99%		

Analysis Date/Time: 07-18-09/02:44

Analyst Initials: tjj

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Analytical Report

Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: 8270 BNA/PAH-SIM

Prep Method: 3520C

BNA Analytical Batch: 072009B

Client Sample ID: UPSTREAM #2 NEAR IMPACTS

Envision Sample Number: 9-10001

Sample Matrix: water

Sample Collection Date/Time: 7/13/09

Sample Received Date/Time: 7/15/09 16:28

<u>BNA Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Aniline	< 10	10	
Benzoic Acid	< 50	50	
Benzyl Alcohol	< 20	20	
4-Bromophenylphenyl ether	< 10	10	
Butylbenzylphthalate	< 10	10	
Carbazole	< 20	20	
4-Chloro-3-methylphenol	< 20	20	
4-Chloroaniline	< 20	20	
bis(2-Chloroethoxy)methane	< 10	10	
bis(2-Chloroethyl)ether	< 10	10	
bis(2-Chloroisopropyl)ether	< 10	10	
2-Chloronaphthalene	< 10	10	
2-Chlorophenol	< 10	10	
4-Chlorophenylphenyl ether	< 10	10	
Dibenzofuran	< 10	10	
1,2-Dichlorobenzene	< 10	10	
1,3-Dichlorobenzene	< 10	10	
1,4-Dichlorobenzene	< 10	10	
3,3-Dichlorobenzidine	< 20	20	
2,4-Dichlorophenol	< 10	10	
Diethylphthalate	< 10	10	
2,4-Dimethylphenol	< 10	10	
Dimethylphthalate	< 10	10	
Di-n-butylphthalate	< 10	10	
4,6-Dinitro-2-methylphenol	< 50	50	
2,4-Dinitrophenol	< 50	50	
2,4-Dinitrotoluene	< 10	10	
2,6-Dinitrotoluene	< 10	10	
Di-n-octylphthalate	< 10	10	
bis(2-Ethylhexyl)phthalate	< 5	5	
Hexachloro-1,3-butadiene	< 10	10	
Hexachlorobenzene	< 5	5	
Hexachlorocyclopentadiene	< 25	25	
Hexachloroethane	< 10	10	



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Analytical Report

8270 Continued...

<u>Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Isophorone	< 10	10	
2-Methylphenol (o-Cresol)	< 10	10	
3&4-Methylphenol	< 20	20	
2-Nitroaniline	< 50	50	
3-Nitroaniline	< 50	50	
4-Nitroaniline	< 50	50	
Nitrobenzene	< 10	10	
2-Nitrophenol	< 10	10	
4-Nitrophenol	< 50	50	
N-Nitroso-di-n-propylamine	< 10	10	
N-Nitrosodiphenylamine	< 10	10	
Pentachlorophenol	< 50	50	
Phenol	< 10	10	
1,2,4-Trichlorobenzene	< 10	10	
2,4,5-Trichlorophenol	< 10	10	
2,4,6-Trichlorophenol	< 10	10	
2-Fluorophenol (surrogate)	73%		
Phenol-d6 (surrogate)	82%		
Nitrobenzene-d5 (surrogate)	97%		
2-Fluorobiphenyl (surrogate)	64%		
2,4,6-Tribromophenol (surrogate)	37%		
p-Terphenyl-d14 (surrogate)	34%		
Analysis Date/Time:	07-20-09/13:05		
Analyst Initials:	gjd		
Date Extracted:	7/16/2009		
Initial Sample Volume:	1000 mL		
Final Volume:	1.0 mL		

PAH-SIM Analytical Batch: 072009P

<u>PAH-SIM Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Acenaphthene	1.13	1.0	
Acenaphthylene	< 1.0	1.0	
Anthracene	< 0.10	0.10	
Benzo(a)anthracene	< 0.10	0.10	
Benzo(a)pyrene	< 0.10	0.10	
Benzo(b)fluoranthene	< 0.10	0.10	
Benzo(g,h,i)perylene	< 0.10	0.10	
Benzo(k)fluoranthene	< 0.10	0.10	
Chrysene	< 0.10	0.10	
Dibenzo(a,h)anthracene	< 0.10	0.10	
Fluoranthene	< 1.0	1.0	
Fluorene	< 1.0	1.0	
Indeno(1,2,3-cd)pyrene	< 0.022	0.022	
2-methylnaphthalene	< 1.0	1.0	
Naphthalene	< 1.0	1.0	
Phenanthrene	< 1.0	1.0	
Pyrene	1.06	1.0	

Analysis Date/Time: 07-20-09/10:55

Analyst Initials

gjd

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Analytical Report

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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: 8260

Prep Method: 5030B

Analytical Batch: 071809VW

Client Sample ID: DOWNSTREAM

Envision Sample Number: 9-10002

Sample Matrix: water

Sample Collection Date/Time: 7/13/09

Sample Received Date/Time: 7/15/09 16:28

<u>Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Acetone	< 100	100	
Acrolein	< 100	100	
Acrylonitrile	< 100	100	
Benzene	< 5	5	
Bromobenzene	< 5	5	
Bromochloromethane	< 5	5	
Bromodichloromethane	< 5	5	
Bromoform	< 5	5	
Bromomethane	< 5	5	
n-Butanol	< 50	50	
2-Butanone (MEK)	< 10	10	
n-Butylbenzene	< 5	5	
sec-Butylbenzene	< 5	5	
tert-Butylbenzene	< 5	5	
Carbon Disulfide	< 5	5	
Carbon Tetrachloride	< 5	5	
Chlorobenzene	< 5	5	
Chloroethane	< 5	5	
2-Chloroethylvinylether	< 50	50	
Chloroform	< 5	5	
Chloromethane	< 5	5	
2-Chlorotoluene	< 5	5	
4-Chlorotoluene	< 5	5	
1,2-Dibromo-3-chloropropane	< 5	5	
Dibromochloromethane	< 5	5	
1,2-Dibromoethane (EDB)	< 5	5	
Dibromomethane	< 5	5	
1,2-Dichlorobenzene	< 5	5	
1,3-Dichlorobenzene	< 5	5	
1,4-Dichlorobenzene	< 5	5	
trans-1,4-Dichloro-2-butene	< 100	100	
Dichlorodifluoromethane	< 5	5	



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8260 continued...

<u>Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
1,1-Dichloroethane	< 5	5	
1,2-Dichloroethane	< 5	5	
1,1-Dichloroethene	< 5	5	
cis-1,2-Dichloroethene	< 5	5	
trans-1,2-Dichloroethene	< 5	5	
1,2-Dichloropropane	< 5	5	
1,3-Dichloropropane	< 5	5	
2,2-Dichloropropane	< 5	5	
1,1-Dichloropropene	< 5	5	
cis-1,3-Dichloropropene	< 5	5	
trans-1,3-Dichloropropene	< 5	5	
Ethylbenzene	< 5	5	
Ethyl methacrylate	< 100	100	
Hexachloro-1,3-butadiene	< 5	5	
n-Hexane	< 10	10	
2-Hexanone	< 10	10	
Iodomethane	< 10	10	
Isopropylbenzene (Cumene)	< 5	5	
p-Isopropyltoluene	< 5	5	
Methylene chloride	< 5	5	
4-Methyl-2-pentanone (MIBK)	< 10	10	
Methyl-tert-butyl-ether	< 5	5	
Naphthalene	< 5	5	
n-Propylbenzene	< 5	5	
Styrene	< 5	5	
1,1,1,2-Tetrachloroethane	< 5	5	
1,1,2,2-Tetrachloroethane	< 5	5	
Tetrachloroethene	< 5	5	
Toluene	< 5	5	
1,2,3-Trichlorobenzene	< 5	5	
1,2,4-Trichlorobenzene	< 5	5	
1,1,1-Trichloroethane	< 5	5	
1,1,2-Trichloroethane	< 5	5	
Trichloroethene	< 5	5	
Trichlorofluoromethane	< 5	5	
1,2,3-Trichloropropane	< 5	5	
1,2,4-Trimethylbenzene	< 5	5	
1,3,5-Trimethylbenzene	< 5	5	
Vinyl acetate	< 10	10	
Vinyl chloride	< 2	2	
Xylene, M&P	< 5	5	
Xylene, Ortho	< 5	5	
Xylene (Total)	< 10	10	
Dibromofluoromethane (surrogate)	111%		
1,2-Dichloroethane-d4 (surrogate)	89%		
Toluene-d8 (surrogate)	114%		
4-bromofluorobenzene (surrogate)	95%		

Analysis Date/Time:

07-18-09/03:07

Analyst Initials

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Analytical Report

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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: 8270 BNA/PAH-SIM

Prep Method: 3520C

BNA Analytical Batch: 072009B

Client Sample ID: DOWNSTREAM

Envision Sample Number: 9-10002

Sample Matrix: water

Sample Collection Date/Time: 7/13/09

Sample Received Date/Time: 7/15/09 16:28

<u>BNA Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Aniline	< 10	10	
Benzoic Acid	< 50	50	
Benzyl Alcohol	< 20	20	
4-Bromophenylphenyl ether	< 10	10	
Butylbenzylphthalate	< 10	10	
Carbazole	< 20	20	
4-Chloro-3-methylphenol	< 20	20	
4-Chloroaniline	< 20	20	
bis(2-Chloroethoxy)methane	< 10	10	
bis(2-Chloroethyl)ether	< 10	10	
bis(2-Chloroisopropyl)ether	< 10	10	
2-Chloronaphthalene	< 10	10	
2-Chlorophenol	< 10	10	
4-Chlorophenylphenyl ether	< 10	10	
Dibenzofuran	< 10	10	
1,2-Dichlorobenzene	< 10	10	
1,3-Dichlorobenzene	< 10	10	
1,4-Dichlorobenzene	< 10	10	
3,3-Dichlorobenzidine	< 20	20	
2,4-Dichlorophenol	< 10	10	
Diethylphthalate	< 10	10	
2,4-Dimethylphenol	< 10	10	
Dimethylphthalate	< 10	10	
Di-n-butylphthalate	< 10	10	
4,6-Dinitro-2-methylphenol	< 50	50	
2,4-Dinitrophenol	< 50	50	
2,4-Dinitrotoluene	< 10	10	
2,6-Dinitrotoluene	< 10	10	
Di-n-octylphthalate	< 10	10	
bis(2-Ethylhexyl)phthalate	< 5	5	
Hexachloro-1,3-butadiene	< 10	10	
Hexachlorobenzene	< 5	5	
Hexachlorocyclopentadiene	< 25	25	
Hexachloroethane	< 10	10	



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Analytical Report

8270 Continued...

<u>Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Isophorone	< 10	10	
2-Methylphenol (o-Cresol)	< 10	10	
3&4-Methylphenol	< 20	20	
2-Nitroaniline	< 50	50	
3-Nitroaniline	< 50	50	
4-Nitroaniline	< 50	50	
Nitrobenzene	< 10	10	
2-Nitrophenol	< 10	10	
4-Nitrophenol	< 50	50	
N-Nitroso-di-n-propylamine	< 10	10	
N-Nitrosodiphenylamine	< 10	10	
Pentachlorophenol	< 50	50	
Phenol	< 10	10	
1,2,4-Trichlorobenzene	< 10	10	
2,4,5-Trichlorophenol	< 10	10	
2,4,6-Trichlorophenol	< 10	10	
2-Fluorophenol (surrogate)	82%		
Phenol-d6 (surrogate)	74%		
Nitrobenzene-d5 (surrogate)	105%		
2-Fluorobiphenyl (surrogate)	84%		
2,4,6-Tribromophenol (surrogate)	33%		
p-Terphenyl-d14 (surrogate)	51%		
Analysis Date/Time:	07-20-09/13:35		
Analyst Initials:	gjd		
Date Extracted:	7/16/2009		
Initial Sample Volume:	1000 mL		
Final Volume:	1.0 mL		

PAH-SIM Analytical Batch: 072009P

<u>PAH-SIM Compounds</u>	<u>Sample Results (ug/L)</u>	<u>Reporting Limit (ug/L)</u>	<u>Flags</u>
Acenaphthene	< 1.0	1.0	
Acenaphthylene	< 1.0	1.0	
Anthracene	< 0.10	0.10	
Benzo(a)anthracene	< 0.10	0.10	
Benzo(a)pyrene	< 0.10	0.10	
Benzo(b)fluoranthene	< 0.10	0.10	
Benzo(g,h,i)perylene	< 0.10	0.10	
Benzo(k)fluoranthene	< 0.10	0.10	
Chrysene	< 0.10	0.10	
Dibenzo(a,h)anthracene	< 0.10	0.10	
Fluoranthene	< 1.0	1.0	
Fluorene	< 1.0	1.0	
Indeno(1,2,3-cd)pyrene	< 0.022	0.022	
2-methylnaphthalene	< 1.0	1.0	
Naphthalene	< 1.0	1.0	
Phenanthrene	< 1.0	1.0	
Pyrene	< 1.0	1.0	

Analysis Date/Time: 07-20-09/11:23

Analyst Initials

gjd

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Analytical Report

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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: TCLP Metals 6010B/7471A

Prep Method: 1311

Client Sample ID: TAR/SOIL MIX

Envision Sample Number: 9-10003

Sample Matrix: soil

Sample Collection Date/Time: 7/13/09 12:45

Sample Received Date/Time: 7/15/09 16:28

<u>Compounds</u>	<u>Sample Results (mg/l)</u>	<u>Reporting Limit (mg/l)</u>	<u>Flags</u>
Arsenic	< 0.01	0.01	
Barium	< 0.1	0.1	
Cadmium	< 0.005	0.005	
Chromium	< 0.01	0.01	
Lead	< 0.01	0.01	
Mercury	< 0.002	0.002	
Selenium	< 0.01	0.01	
Silver	< 0.05	0.05	

Analysis Date/Time: 07-24-09/08:59

Analyst Initials: gjd

Date Digested: 7/22/2009

Initial Sample Volume: 50 ml

Final Volume: 50 ml

Analytical Batch: 072409icp

Hg Analysis Date/Time:

Hg Analyst Initials:

Date Digested:

Initial Sample Volume:

Final Volume:

Analytical Batch:

07-22-09/12:47

gjd

7/21/2009

50 ml

50 ml

072209hgw

Results reported on wet weight basis.



Analytical Report

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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: TCLP VOC Method 5035A/8260B

Prep Method: 1311

Analytical Batch: 072209TCLP

Client Sample ID: TAR/SOIL MIX

Envision Sample Number: 9-10003

Sample Matrix: soil

Sample Collection Date/Time: 7/13/09 12:45

Sample Received Date/Time: 7/15/09 16:28

<u>Compounds</u>	<u>Sample Results (mg/l)</u>	<u>Reporting Limit (mg/l)</u>	<u>Flags</u>
Benzene	< 0.050	0.05	
Methyl ethyl ketone (MEK)	< 0.100	0.1	
Carbon Tetrachloride	< 0.050	0.05	
Chlorobenzene	< 0.050	0.05	
Chloroform	< 0.050	0.05	
1,2-Dichloroethane	< 0.050	0.05	
1,1-Dichloroethene	< 0.050	0.05	
Tetrachloroethene	< 0.050	0.05	
Trichloroethene	< 0.050	0.05	
Vinyl Chloride	< 0.100	0.1	
Dibromofluoromethane (surrogate)	51.9	104%	
1,2-Dichloroethane-d4 (surrogate)	43.2	86%	
Toluene-d8 (surrogate)	52.1	104%	
4-bromofluorobenzene (surrogate)	49.1	98%	
Analysis Date/Time:	07/22/09/09:56		
Analyst Initials	tjg		



Analytical Report

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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: TCLP BNA Compounds Method 3510C/8270C

Prep Method: 1311

Analytical Batch: 072409B

Client Sample ID: TAR/SOIL MIX

Envision Sample Number: 9-10003

Sample Matrix: soil

Sample Collection Date/Time: 7/13/09 12:45

Sample Received Date/Time: 7/15/09 16:28

<u>Compounds</u>	<u>Sample Results (mg/L)</u>	<u>Reporting Limit (mg/L)</u>	<u>Flags</u>
1,4-Dichlorobenzene	< 0.1	0.1	
2,4-Dinitrotoluene	< 0.1	0.1	
Hexachlorobenzene	< 0.1	0.1	
Hexachlorobutadiene	< 0.1	0.1	
Hexachloroethane	< 0.1	0.1	
o-Cresol	< 0.1	0.1	
m&P-Cresol	< 0.1	0.1	
Nitrobenzene	< 0.1	0.1	
Pentachlorophenol	< 0.5	0.5	
Pyridine	< 0.5	0.5	
2,4,5-Trichlorophenol	< 0.1	0.1	
2,4,6-Trichlorophenol	< 0.1	0.1	
2-Fluorophenol (surrogate)	95%		
Phenol-d6 (surrogate)	109%		
Nitrobenzene-d5 (surrogate)	101%		
2-Fluorobiphenyl (surrogate)	95%		
2,4,6-Tribromophenol (surroga	55%		
p-Terphenyl-d14 (surrogate)	50%		
Analysis Date/Time:	07-24-09/09:40		
Analyst Initials:	gjd		
Date Extracted:	7/22/2009		
Initial Sample Volume:	200 mL		
Final Volume:	1.0 mL		



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Analytical Report

Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: 8260

Prep Method: 5035A

Analytical Batch: 071909VS

Client Sample ID: DARK SOIL-SOUTH OF TAR
Envision Sample Number: FLOW
Sample Matrix: 9-10004
soil

Sample Collection Date/Time: 7/13/09
Sample Received Date/Time: 7/15/09 16:28

Compounds	Sample Results (ug/kg)	Rep. Limit (ug/kg)	Flags
Acetone	< 112	112	
Acrolein	< 112	112	
Acrylonitrile	< 112	112	
Benzene	< 6	6	
Bromobenzene	< 6	6	
Bromochloromethane	< 6	6	
Bromodichloromethane	< 6	6	
Bromoform	< 6	6	
Bromomethane	< 6	6	
n-Butanol	< 56	56	
2-Butanone (MEK)	< 11	11	
n-Butylbenzene	< 6	6	
sec-Butylbenzene	< 6	6	
tert-Butylbenzene	< 6	6	
Carbon Disulfide	< 6	6	
Carbon Tetrachloride	< 6	6	
Chlorobenzene	< 6	6	
Chloroethane	< 6	6	
2-Chloroethylvinylether	< 56	56	
Chloroform	< 6	6	
Chloromethane	< 6	6	
2-Chlorotoluene	< 6	6	
4-Chlorotoluene	< 6	6	
1,2-Dibromo-3-chloropropane	< 6	6	
Dibromochloromethane	< 6	6	
1,2-Dibromoethane (EDB)	< 6	6	
Dibromomethane	< 6	6	
1,2-Dichlorobenzene	< 6	6	
1,3-Dichlorobenzene	< 6	6	
1,4-Dichlorobenzene	< 6	6	
trans-1,4-Dichloro-2-butene	< 112	112	
Dichlorodifluoromethane	< 6	6	
1,1-Dichloroethane	< 6	6	
1,2-Dichloroethane	< 6	6	
1,1-Dichloroethene	< 6	6	



Analytical Report

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8260 continued...

Compounds	Sample Results (ug/kg)	Rep. Limit (ug/kg)	Flags
cis-1,2-Dichloroethene	< 6	6	
trans-1,2-Dichloroethene	< 6	6	
1,2-Dichloropropane	< 6	6	
1,3-Dichloropropane	< 6	6	
2,2-Dichloropropane	< 6	6	
1,1-Dichloropropene	< 6	6	
cis-1,3-Dichloropropene	< 6	6	
trans-1,3-Dichloropropene	< 6	6	
Ethylbenzene	< 6	6	
Ethyl methacrylate	< 112	112	
Hexachloro-1,3-butadiene	< 6	6	
n-Hexane	< 11	11	
2-Hexanone	< 11	11	
Iodomethane	< 11	11	
Isopropylbenzene (Cumene)	< 6	6	
p-Isopropyltoluene	< 6	6	
Methylene chloride	< 22	22	
4-Methyl-2-pentanone (MIBK)	< 11	11	
Methyl-tert-butyl-ether	< 6	6	
Naphthalene	< 6	6	
n-Propylbenzene	< 6	6	
Styrene	< 6	6	
1,1,1,2-Tetrachloroethane	< 6	6	
1,1,2,2-Tetrachloroethane	< 6	6	
Tetrachloroethene	< 6	6	
Toluene	< 6	6	
1,2,3-Trichlorobenzene	< 6	6	
1,2,4-Trichlorobenzene	< 6	6	
1,1,1-Trichloroethane	< 6	6	
1,1,2-Trichloroethane	< 6	6	
Trichloroethene	< 6	6	
Trichlorofluoromethane	< 6	6	
1,2,3-Trichloropropane	< 6	6	
1,2,4-Trimethylbenzene	< 6	6	
1,3,5-Trimethylbenzene	< 6	6	
Vinyl acetate	< 11	11	
Vinyl chloride	< 2	2	
Xylene, M&P	< 6	6	
Xylene, Ortho	< 6	6	
Xylene, Total	< 11	11	
Dibromofluoromethane (surrogate)	113%		
1,2-Dichloroethane-d4 (surrogate)	119%		
Toluene-d8 (surrogate)	111%		
4-bromofluorobenzene (surrogate)	100%		
Analysis Date/Time:	07-19-09/17:28		
Analyst Initials	tjg		

Percent Solids:

89%

All results reported on dry weight basis.

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Analytical Report

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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: 8270 SVOC

Prep Method: 3550B

Analytical Batch: 071609B

Client Sample ID: DARK SOIL-SOUTH OF TAR FLOW

Envision Sample Number: 9-10004

Sample Matrix: soil

Sample Collection Date/Time: 7/13/09

Sample Received Date/Time: 7/15/09 16:28

Compounds	Sample Results (mg/kg)	Rep. Limit (mg/kg)	Flags
Acenaphthene	< 0.37	0.37	
Acenaphthylene	< 0.37	0.37	
Aniline	< 0.37	0.37	
Anthracene	< 0.37	0.37	
Benzo(a)anthracene	< 0.37	0.37	
Benzo(a)pyrene	< 0.37	0.37	
Benzo(b)fluoranthene	< 0.37	0.37	
Benzo(g,h,i)perylene	< 0.37	0.37	
Benzo(k)fluoranthene	< 0.37	0.37	
Benzoic Acid	< 1.80	1.80	
Benzyl Alcohol	< 0.74	0.74	
4-Bromophenylphenyl ether	< 0.37	0.37	
Butylbenzylphthalate	< 0.37	0.37	
Carbazole	< 0.74	0.74	
4-Chloro-3-methylphenol	< 0.74	0.74	
4-Chloroaniline	< 0.74	0.74	
bis(2-Chloroethoxy)methane	< 0.37	0.37	
bis(2-Chloroethyl)ether	< 0.37	0.37	
bis(2-Chloroisopropyl)ether	< 0.37	0.37	
2-Chloronaphthalene	< 0.37	0.37	
2-Chlorophenol	< 0.37	0.37	
4-Chlorophenylphenyl ether	< 0.37	0.37	
Chrysene	< 0.37	0.37	
Dibenzo(a,h)anthracene	< 0.37	0.37	
Dibenzofuran	< 0.37	0.37	
1,2-Dichlorobenzene	< 0.37	0.37	
1,3-Dichlorobenzene	< 0.37	0.37	
1,4-Dichlorobenzene	< 0.37	0.37	
3,3-Dichlorobenzidine	< 0.74	0.74	
2,4-Dichlorophenol	< 0.37	0.37	
Diethylphthalate	< 0.37	0.37	
2,4-Dimethylphenol	< 0.37	0.37	
Dimethylphthalate	< 0.37	0.37	
Di-n-butylphthalate	< 0.37	0.37	



Analytical Report

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8270 continued...

Compounds	Sample Results (mg/kg)	Rep. Limit (mg/kg)	Flags
4,6-Dinitro-2-methylphenol	< 1.80	1.80	
2,4-Dinitrophenol	< 1.80	1.80	
2,4-Dinitrotoluene	< 0.37	0.37	
2,6-Dinitrotoluene	< 0.37	0.37	
Di-n-octylphthalate	< 0.37	0.37	
bis(2-Ethylhexyl)phthalate	< 0.37	0.37	
Fluoranthene	< 0.37	0.37	
Fluorene	< 0.37	0.37	
Hexachloro-1,3-butadiene	< 0.37	0.37	
Hexachlorobenzene	< 0.37	0.37	
Hexachlorocyclopentadiene	< 0.37	0.37	
Hexachloroethane	< 0.37	0.37	
Indeno(1,2,3-cd)pyrene	< 0.37	0.37	
Isophorone	< 0.37	0.37	
2-Methylnaphthalene	< 0.37	0.37	
2-Methylphenol (o-Cresol)	< 0.37	0.37	
3&4-Methylphenol	< 0.74	0.74	
Naphthalene	< 0.37	0.37	
2-Nitroaniline	< 1.80	1.80	
3-Nitroaniline	< 1.80	1.80	
4-Nitroaniline	< 1.80	1.80	
Nitrobenzene	< 0.37	0.37	
2-Nitrophenol	< 0.37	0.37	
4-Nitrophenol	< 1.80	1.80	
N-Nitroso-di-n-propylamine	< 0.37	0.37	
N-Nitrosodiphenylamine	< 0.37	0.37	
Pentachlorophenol	< 1.80	1.80	
Phenanthrene	< 0.34	0.34	
Phenol	< 0.37	0.37	
Pyrene	< 0.37	0.37	
1,2,4-Trichlorobenzene	< 0.37	0.37	
2,4,5-Trichlorophenol	< 0.37	0.37	
2,4,6-Trichlorophenol	< 0.37	0.37	
2-Fluorophenol (surrogate)	98%		
Phenol-d6 (surrogate)	95%		
Nitrobenzene-d5 (surrogate)	100%		
2-Fluorobiphenyl (surrogate)	73%		
2,4,6-Tribromophenol (surrogate)	41%		
p-Terphenyl-d14 (surrogate)	52%		
Analysis Date/Time:	07-16-09/23:01		
Analyst Initials:	gjd		
Date Extracted:	7/16/2009		
Initial Sample Weight:	30 g		
Final Volume:	1.0 mL		
Percent Solids	89%		



Analytical Report

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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Client Sample ID: DARK SOIL-SOUTH OF TAR
Envision Sample Number: FLOW 9-10004

Sample Matrix: soil

Sample Collection Date/Time: 7/13/09
Sample Received Date/Time: 7/15/09 16:28

<u>Analyte</u>	<u>Sample Results</u>	<u>Flags</u>	<u>Method</u>
Percent Moisture	11.0%		1684
Percent Solids	89.0%		1684
Analysis Date:	7/18/09		
Analyst Initials	zrc		



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Analytical Report

Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: 8260

Prep Method: 5035A

Analytical Batch: 071909VS

Client Sample ID: SOIL DIRECTLY UNDER TAR
Envision Sample Number: FLOW
Sample Matrix: 9-10005
soil

Sample Collection Date/Time: 7/13/09 12:45

Sample Received Date/Time: 7/15/09 16:28

Compounds	Sample Results (ug/kg)	Rep. Limit (ug/kg)	Flags
Acetone	< 106	106	
Acrolein	< 106	106	
Acrylonitrile	< 106	106	
Benzene	< 5	5	
Bromobenzene	< 5	5	
Bromochloromethane	< 5	5	
Bromodichloromethane	< 5	5	
Bromoform	< 5	5	
Bromomethane	< 5	5	
n-Butanol	< 53	53	
2-Butanone (MEK)	< 11	11	
n-Butylbenzene	< 5	5	
sec-Butylbenzene	< 5	5	
tert-Butylbenzene	< 5	5	
Carbon Disulfide	< 5	5	
Carbon Tetrachloride	< 5	5	
Chlorobenzene	< 5	5	
Chloroethane	< 5	5	
2-Chloroethylvinylether	< 53	53	
Chloroform	< 5	5	
Chloromethane	< 5	5	
2-Chlorotoluene	< 5	5	
4-Chlorotoluene	< 5	5	
1,2-Dibromo-3-chloropropane	< 5	5	
Dibromochloromethane	< 5	5	
1,2-Dibromoethane (EDB)	< 5	5	
Dibromomethane	< 5	5	
1,2-Dichlorobenzene	< 5	5	
1,3-Dichlorobenzene	< 5	5	
1,4-Dichlorobenzene	< 5	5	
trans-1,4-Dichloro-2-butene	< 106	106	
Dichlorodifluoromethane	< 5	5	
1,1-Dichloroethane	< 5	5	
1,2-Dichloroethane	< 5	5	
1,1-Dichloroethene	< 5	5	



Analytical Report

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8260 continued...

Compounds	Sample Results (ug/kg)	Rep. Limit (ug/kg)	Flags
cis-1,2-Dichloroethene	< 5	5	
trans-1,2-Dichloroethene	< 5	5	
1,2-Dichloropropane	< 5	5	
1,3-Dichloropropane	< 5	5	
2,2-Dichloropropane	< 5	5	
1,1-Dichloropropene	< 5	5	
cis-1,3-Dichloropropene	< 5	5	
trans-1,3-Dichloropropene	< 5	5	
Ethylbenzene	< 5	5	
Ethyl methacrylate	< 106	106	
Hexachloro-1,3-butadiene	< 5	5	
n-Hexane	< 11	11	
2-Hexanone	< 11	11	
Iodomethane	< 11	11	
Isopropylbenzene (Cumene)	< 5	5	
p-Isopropyltoluene	< 5	5	
Methylene chloride	< 21	21	
4-Methyl-2-pentanone (MIBK)	< 11	11	
Methyl-tert-butyl-ether	< 5	5	
Naphthalene	< 5	5	
n-Propylbenzene	< 5	5	
Styrene	< 5	5	
1,1,1,2-Tetrachloroethane	< 5	5	
1,1,2,2-Tetrachloroethane	< 5	5	
Tetrachloroethene	< 5	5	
Toluene	< 5	5	
1,2,3-Trichlorobenzene	< 5	5	
1,2,4-Trichlorobenzene	< 5	5	
1,1,1-Trichloroethane	< 5	5	
1,1,2-Trichloroethane	< 5	5	
Trichloroethene	< 5	5	
Trichlorofluoromethane	< 5	5	
1,2,3-Trichloropropane	< 5	5	
1,2,4-Trimethylbenzene	< 5	5	
1,3,5-Trimethylbenzene	< 5	5	
Vinyl acetate	< 11	11	
Vinyl chloride	< 2	2	
Xylene, M&P	< 5	5	
Xylene, Ortho	< 5	5	
Xylene, Total	< 11	11	
Dibromofluoromethane (surrogate)	99%		
1,2-Dichloroethane-d4 (surrogate)	105%		
Toluene-d8 (surrogate)	105%		
4-bromofluorobenzene (surrogate)	91%		
Analysis Date/Time:	07-19-09/17:50		
Analyst Initials	tjg		

Percent Solids:

94%

All results reported on dry weight basis.

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Analytical Report

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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

Analytical Method: 8270 SVOC

Prep Method: 3550B

Analytical Batch: 071609B

Client Sample ID: SOIL DIRECTLY UNDER TAR FLOW

Sample Collection Date/Time: 7/13/09 12:45

Envision Sample Number: 9-10005

Sample Received Date/Time: 7/15/09 16:28

Sample Matrix: soil

Compounds	Sample Results (mg/kg)	Rep. Limit (mg/kg)	Flags
Acenaphthene	< 0.35	0.35	
Acenaphthylene	1.39	0.35	
Aniline	< 0.35	0.35	
Anthracene	1.48	0.35	
Benzo(a)anthracene	4.16	0.35	1
Benzo(a)pyrene	< 0.35	0.35	
Benzo(b)fluoranthene	< 0.35	0.35	
Benzo(g,h,i)perylene	< 0.35	0.35	
Benzo(k)fluoranthene	< 0.35	0.35	
Benzoic Acid	< 1.70	1.70	
Benzyl Alcohol	< 0.70	0.70	
4-Bromophenylphenyl ether	< 0.35	0.35	
Butylbenzylphthalate	< 0.35	0.35	
Carbazole	< 0.70	0.70	
4-Chloro-3-methylphenol	< 0.70	0.70	
4-Chloroaniline	< 0.70	0.70	
bis(2-Chloroethoxy)methane	< 0.35	0.35	
bis(2-Chloroethyl)ether	< 0.35	0.35	
bis(2-Chloroisopropyl)ether	< 0.35	0.35	
2-Chloronaphthalene	1.20	0.35	
2-Chlorophenol	< 0.35	0.35	
4-Chlorophenylphenyl ether	< 0.35	0.35	
Chrysene	2.85	0.35	
Dibenzo(a,h)anthracene	< 0.35	0.35	
Dibenzofuran	< 0.35	0.35	
1,2-Dichlorobenzene	< 0.35	0.35	
1,3-Dichlorobenzene	< 0.35	0.35	
1,4-Dichlorobenzene	< 0.35	0.35	
3,3-Dichlorobenzidine	< 0.70	0.70	
2,4-Dichlorophenol	< 0.35	0.35	
Diethylphthalate	< 0.35	0.35	
2,4-Dimethylphenol	< 0.35	0.35	
Dimethylphthalate	< 0.35	0.35	
Di-n-butylphthalate	< 0.35	0.35	



Analytical Report

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8270 continued...

Compounds	Sample Results (mg/kg)	Rep. Limit (mg/kg)	Flags
4,6-Dinitro-2-methylphenol	< 1.70	1.70	
2,4-Dinitrophenol	< 1.70	1.70	
2,4-Dinitrotoluene	< 0.35	0.35	
2,6-Dinitrotoluene	< 0.35	0.35	
Di-n-octylphthalate	< 0.35	0.35	
bis(2-Ethylhexyl)phthalate	< 0.35	0.35	
Fluoranthene	12.7	0.35	1
Fluorene	0.72	0.35	
Hexachloro-1,3-butadiene	< 0.35	0.35	
Hexachlorobenzene	< 0.35	0.35	
Hexachlorocyclopentadiene	< 0.35	0.35	
Hexachloroethane	< 0.35	0.35	
Indeno(1,2,3-cd)pyrene	1.27	0.35	
Isophorone	< 0.35	0.35	
2-Methylnaphthalene	< 0.35	0.35	
2-Methylphenol (o-Cresol)	< 0.35	0.35	
3&4-Methylphenol	< 0.70	0.70	
Naphthalene	< 0.35	0.35	
2-Nitroaniline	< 1.70	1.70	
3-Nitroaniline	< 1.70	1.70	
4-Nitroaniline	< 1.70	1.70	
Nitrobenzene	< 0.35	0.35	
2-Nitrophenol	< 0.35	0.35	
4-Nitrophenol	< 1.70	1.70	
N-Nitroso-di-n-propylamine	< 0.35	0.35	
N-Nitrosodiphenylamine	< 0.35	0.35	
Pentachlorophenol	< 1.70	1.70	
Phenanthrene	5.41	0.32	1
Phenol	< 0.35	0.35	
Pyrene	8.17	0.35	1
1,2,4-Trichlorobenzene	< 0.35	0.35	
2,4,5-Trichlorophenol	< 0.35	0.35	
2,4,6-Trichlorophenol	< 0.35	0.35	
2-Fluorophenol (surrogate)	92%		
Phenol-d6 (surrogate)	91%		
Nitrobenzene-d5 (surrogate)	95%		
2-Fluorobiphenyl (surrogate)	72%		
2,4,6-Tribromophenol (surrogate)	40%		
p-Terphenyl-d14 (surrogate)	30%		
Analysis Date/Time:	07-16-09/23:32		
Analyst Initials:	gjd		
Date Extracted:	7/16/2009		
Initial Sample Weight:	30 g		
Final Volume:	1.0 mL		
Percent Solids	94%		



Analytical Report

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Client Name: KERAMIDA ENVIRONMENTAL

Project ID: CAVU-OPS WABASH

Client Project Manager: SCOTT RANDALL

ENVision Project Number: 2009-1424

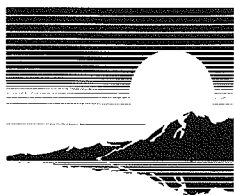
Client Sample ID: SOIL DIRECTLY UNDER TAR
Envision Sample Number: FLOW 9-10005

Sample Matrix: soil

Sample Collection Date/Time: 7/13/09 12:45

Sample Received Date/Time: 7/15/09 16:28

<u>Analyte</u>	<u>Sample Results</u>	<u>Flags</u>	<u>Method</u>
Percent Moisture	6.0%		1684
Percent Solids	94.0%		1684
Analysis Date:	7/18/09		
Analyst Initials	zrc		



**First
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IL ELAP / NELAC Accreditation # 100292

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July 20, 2009

Mr. David Norris

ENVISION LABORATORIES, INC.

1439 Sandler Cir. W. Drive
Indianapolis, IN 46239

Project ID: 2009-1424

First Environmental File ID: 9-2817

Date Received: July 16, 2009

Dear Mr. David Norris:

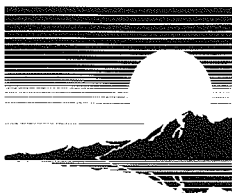
The above referenced project was analyzed as directed on the enclosed chain of custody record.

All Quality Control criteria as outlined in the methods and current IL ELAP/NELAP have been met unless otherwise noted. QA/QC documentation and raw data will remain on file for future reference. Our accreditation number is 100292 and our current certificate is number 002205: effective 02/06/09 through 02/28/10.

I thank you for the opportunity to be of service to you and look forward to working with you again in the future. Should you have any questions regarding any of the enclosed analytical data or need additional information, please contact me at (630) 778-1200 or stan@firstenv.com.

Sincerely,

Stan Zaworski
Project Manager



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IL ELAP / NELAC Accreditation # 100292

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Case Narrative

ENVISION LABORATORIES, INC.

Project ID: **2009-1424**

First Environmental File ID: **9-2817**

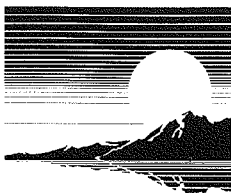
Date Received: **July 16, 2009**

Flag	Description	Flag	Description
<	Analyte not detected at or above the reporting limit.	L+	LCS recovery outside control limits; high bias.
B	Analyte detected in associated method blank.	L-	LCS recovery outside control limits; low bias.
C	Identification confirmed by GC/MS.	M	MS recovery outside control limits; LCS acceptable.
D	Surrogates diluted out; recovery not available.	M+	MS recovery outside control limits high bias; LCS acceptable.
E	Estimated result; concentration exceeds calibration range.	M-	MS recovery outside control limits low bias; LCS acceptable.
F	Field measurement.	N	Analyte is not part of our NELAC accreditation.
		ND	Analyte was not detected using a library search routine; No calibration standard was analyzed.
G	Surrogate recovery outside control limits; matrix effect.	P	Chemical preservation pH adjusted in lab.
H	Analysis or extraction holding time exceeded.	Q	The analyte was determined by a GC/MS database search.
J	Estimated result; concentration is less than calib range.	S	Analyte was sub-contracted to another laboratory for analysis.
K	RPD outside control limits.	T	Sample temperature upon receipt exceeded 0-6°C
RL	Routine Reporting Limit (Lowest amount that can be detected when routine weights/volumes are used without dilution.)	W	Reporting limit elevated due to sample matrix.

All quality control criteria, as outlined in the methods, have been met except as noted below or on the following analytical report.

Sample Batch Comments:

Sample acceptance criteria were met.



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Analytical Report

Client: ENVISION LABORATORIES, INC.

Project ID: 2009-1424

Sample ID: Dark soil south of tar flow/9-10004

Sample No: 9-2817-001

Date Collected: 07/13/09

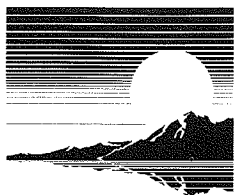
Time Collected:

Date Received: 07/16/09

Date Reported: 07/20/09

Results are reported on a dry weight basis.

Analyte	Result	R.L.	Units	Flags
Solids, total				
Method: 2540B				
Analysis Date: 07/16/09				
Total Solids	88.42		%	
Polychlorinated biphenyls (PCBs)				
Method: 8082				
Preparation Method 3540C				
Analysis Date: 07/20/09				
Preparation Date: 07/16/09				
Aroclor 1016	< 80.0	80.0	ug/kg	
Aroclor 1221	< 80.0	80.0	ug/kg	
Aroclor 1232	< 80.0	80.0	ug/kg	
Aroclor 1242	< 80.0	80.0	ug/kg	
Aroclor 1248	< 80.0	80.0	ug/kg	
Aroclor 1254	< 160	160	ug/kg	
Aroclor 1260	< 160	160	ug/kg	
Tetrachloro-m-xylene (Surr)	91	53-139	%	
Decachlorobiphenyl (Surr)	93	21-139	%	



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Analytical Report

Client: ENVISION LABORATORIES, INC.

Project ID: 2009-1424

Sample ID: Soil directly under tar flow/9-10005

Sample No: 9-2817-002

Date Collected: 07/13/09

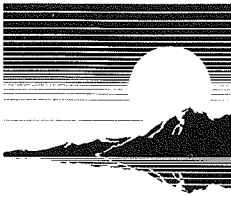
Time Collected: 12:45

Date Received: 07/16/09

Date Reported: 07/20/09

Results are reported on a dry weight basis.

Analyte	Result	R.L.	Units	Flags
Solids, total				
Method: 2540B				
Analysis Date: 07/16/09				
Total Solids	93.69		%	
Polychlorinated biphenyls (PCBs)				
Method: 8082				
Preparation Method 3540C				
Preparation Date: 07/16/09				
Aroclor 1016	< 80.0	80.0	ug/kg	
Aroclor 1221	< 80.0	80.0	ug/kg	
Aroclor 1232	< 80.0	80.0	ug/kg	
Aroclor 1242	< 80.0	80.0	ug/kg	
Aroclor 1248	< 80.0	80.0	ug/kg	
Aroclor 1254	< 160	160	ug/kg	
Aroclor 1260	< 160	160	ug/kg	
Tetrachloro-m-xylene (Surr)	91	53-139	%	
Decachlorobiphenyl (Surr)	111	21-139	%	



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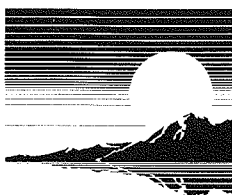
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Analytical Report

Client: ENVISION LABORATORIES, INC.
Project ID: 2009-1424
Sample ID: Upstream # 1/9-10000
Sample No: 9-2817-003

Date Collected: 07/13/09
Time Collected: 11:45
Date Received: 07/16/09
Date Reported: 07/20/09

Analyte	Result	R.L.	Units	Flags
Polychlorinated biphenyls (PCBs)		Method: 8082		
Analysis Date: 07/20/09		Preparation Method 3510C		
		Preparation Date: 07/17/09		
Aroclor 1016	< 0.50	0.50	ug/L	
Aroclor 1221	< 0.50	0.50	ug/L	
Aroclor 1232	< 0.50	0.50	ug/L	
Aroclor 1242	< 0.50	0.50	ug/L	
Aroclor 1248	< 0.50	0.50	ug/L	
Aroclor 1254	< 0.50	0.50	ug/L	
Aroclor 1260	< 0.50	0.50	ug/L	
Tetrachloro-m-xylene (Surr)	69	59-125	%	
Decachlorobiphenyl (Surr)	86	16-134	%	



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Analytical Report

Client: ENVISION LABORATORIES, INC.
Project ID: 2009-1424
Sample ID: Upstream # 2/9-10001
Sample No: 9-2817-004

Date Collected: 07/13/09
Time Collected:
Date Received: 07/16/09
Date Reported: 07/20/09

Analyte	Result	R.L.	Units	Flags
Polychlorinated biphenyls (PCBs)		Method: 8082		
Analysis Date: 07/20/09		Preparation Method 3510C		
		Preparation Date: 07/17/09		
Aroclor 1016	< 0.50	0.50	ug/L	
Aroclor 1221	< 0.50	0.50	ug/L	
Aroclor 1232	< 0.50	0.50	ug/L	
Aroclor 1242	< 0.50	0.50	ug/L	
Aroclor 1248	< 0.50	0.50	ug/L	
Aroclor 1254	< 0.50	0.50	ug/L	
Aroclor 1260	< 0.50	0.50	ug/L	
Tetrachloro-m-xylene (Surr)	80	59-125	%	
Decachlorobiphenyl (Surr)	96	16-134	%	



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Analytical Report

Client: ENVISION LABORATORIES, INC.

Project ID: 2009-1424

Sample ID: Downstream/9-10002

Sample No: 9-2817-005

Date Collected: 07/13/09

Time Collected:

Date Received: 07/16/09

Date Reported: 07/20/09

Analyte	Result	R.L.	Units	Flags
Polychlorinated biphenyls (PCBs)		Method: 8082		
Analysis Date: 07/20/09		Preparation Method 3510C		
		Preparation Date: 07/17/09		
Aroclor 1016	< 0.50	0.50	ug/L	
Aroclor 1221	< 0.50	0.50	ug/L	
Aroclor 1232	< 0.50	0.50	ug/L	
Aroclor 1242	< 0.50	0.50	ug/L	
Aroclor 1248	< 0.50	0.50	ug/L	
Aroclor 1254	< 0.50	0.50	ug/L	
Aroclor 1260	< 0.50	0.50	ug/L	
Tetrachloro-m-xylene (Surr)	75	59-125	%	
Decachlorobiphenyl (Surr)	95	16-134	%	



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8260 Quality Control Data

ENVision Batch Number: 071909VS

<u>Method Blank (MB):</u>	<u>MB Results (ug/kg)</u>	<u>Rep Lim (ug/kg)</u>	<u>Flag</u>
Acetone	< 100	100	
Acrolein	< 100	100	
Acrylonitrile	< 100	100	
Benzene	< 5	5	
Bromobenzene	< 5	5	
Bromochloromethane	< 5	5	
Bromodichloromethane	< 5	5	
Bromoform	< 5	5	
Bromomethane	< 5	5	
n-Butanol	< 50	50	
2-Butanone (MEK)	< 10	10	
n-Butylbenzene	< 5	5	
sec-Butylbenzene	< 5	5	
tert-Butylbenzene	< 5	5	
Carbon Disulfide	< 5	5	
Carbon Tetrachloride	< 5	5	
Chlorobenzene	< 5	5	
Chloroethane	< 5	5	
2-Chloroethylvinylether	< 50	50	
Chloroform	< 5	5	
Chloromethane	< 5	5	
2-Chlorotoluene	< 5	5	
4-Chlorotoluene	< 5	5	
1,2-Dibromo-3-chloropropane	< 5	5	
Dibromochloromethane	< 5	5	
1,2-Dibromoethane (EDB)	< 5	5	
Dibromomethane	< 5	5	
1,2-Dichlorobenzene	< 5	5	
1,3-Dichlorobenzene	< 5	5	
1,4-Dichlorobenzene	< 5	5	
trans-1,4-Dichloro-2-butene	< 100	100	
Dichlorodifluoromethane	< 5	5	
1,1-Dichloroethane	< 5	5	
1,2-Dichloroethane	< 5	5	
1,1-Dichloroethene	< 5	5	
cis-1,2-Dichloroethene	< 5	5	
trans-1,2-Dichloroethene	< 5	5	
1,2-Dichloropropane	< 5	5	
1,3-Dichloropropane	< 5	5	
2,2-Dichloropropane	< 5	5	
1,1-Dichloropropene	< 5	5	
cis-1,3-Dichloropropene	< 5	5	
trans-1,3-Dichloropropene	< 5	5	
Ethylbenzene	< 5	5	
Ethyl methacrylate	< 100	100	

8260 QC Continued...



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	<u>MB Results (ug/kg)</u>	<u>Rep Lim (ug/kg)</u>	<u>Flag</u>
Hexachloro-1,3-butadiene	< 5	5	
2-Hexanone	< 10	10	
n-Hexane	< 10	10	
Iodomethane	< 10	10	
Isopropylbenzene (Cumene)	< 5	5	
p-Isopropyltoluene	< 5	5	
Methylene chloride	< 5	5	
4-Methyl-2-pentanone (MIBK)	< 10	10	
Methyl-tert-butyl-ether	< 5	5	
Naphthalene	< 5	5	
n-Propylbenzene	< 5	5	
Styrene	< 5	5	
1,1,1,2-Tetrachloroethane	< 5	5	
1,1,2,2-Tetrachloroethane	< 5	5	
Tetrachloroethene	< 5	5	
Toluene	< 5	5	
1,2,3-Trichlorobenzene	< 5	5	
1,2,4-Trichlorobenzene	< 5	5	
1,1,1-Trichloroethane	< 5	5	
1,1,2-Trichloroethane	< 5	5	
Trichloroethene	< 5	5	
Trichlorofluoromethane	< 5	5	
1,2,3-Trichloropropane	< 5	5	
1,2,4-Trimethylbenzene	< 5	5	
1,3,5-Trimethylbenzene	< 5	5	
Vinyl acetate	< 10	10	
Vinyl chloride	< 2	2	
Xylene, M&P	< 5	5	
Xylene, Ortho	< 5	5	
Xylenes, Total	<10	10	
Dibromofluoromethane (surrogate)	114%		
1,2-Dichloroethane-d4 (surrogate)	117%		
Toluene-d8 (surrogate)	104%		
4-bromofluorobenzene (surrogate)	86%		
Analysis Date/Time:	07-19-09/17:06		
Analyst Initials	tjg		



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8260 QC Continued...

<u>Laboratory Control Standard (LCS):</u>	<u>LCS Results (ug/kg)</u>	<u>LCS Conc(ug/kg)</u>	<u>% Rec</u>	<u>Flag</u>
Vinyl Chloride	49.3	50	99%	
1,1-Dichloroethene	53.9	50	108%	
trans-1,2-Dichloroethene	51.5	50	103%	
Methyl-tert-butyl ether	41.1	50	82%	
1,1-dichloroethane	48.1	50	96%	
cis-1,2-Dichloroethene	51.1	50	102%	
Chloroform	53.2	50	106%	
1,1,1-Trichloroethane	55.4	50	111%	
Benzene	54.4	50	109%	
Trichloroethene	55.3	50	111%	
Toluene	57.8	50	116%	
1,1,1,2-Tetrachloroethane	53.6	50	107%	
Chlorobenzene	53.8	50	108%	
Ethylbenzene	46.1	50	92%	
O-Xylene	53.3	50	107%	
N-propylbenzene	48.8	50	98%	
Dibromofluoromethane (surrogate)	110%			
1,2-Dichloroethane-d4 (surrogate)	121%			
Toluene-d8 (surrogate)	126%			
4-bromofluorobenzene (surrogate)	121%			
Analysis Date/Time:	07-19-09/16:22			
Analyst Initials	tjg			



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8270 Quality Control Data

ENVision Batch Number: 071609B

Method Blank (MB):	Method Blank Results (mg/kg)	Reporting Limit (mg/kg)	Flag
Acenaphthene	< 0.33	0.33	
Acenaphthylene	< 0.33	0.33	
Aniline	< 0.33	0.33	
Anthracene	< 0.33	0.33	
Benzo(a)anthracene	< 0.33	0.33	
Benzo(a)pyrene	< 0.33	0.33	
Benzo(b)fluoranthene	< 0.33	0.33	
Benzo(g,h,i)perylene	< 0.33	0.33	
Benzo(k)fluoranthene	< 0.33	0.33	
Benzoic Acid	< 1.6	1.6	
Benzyl Alcohol	< 0.66	0.66	
4-Bromophenylphenyl ether	< 0.33	0.33	
Butylbenzylphthalate	< 0.33	0.33	
Carbazole	< 0.66	0.66	
4-Chloro-3-methylphenol	< 0.66	0.66	
4-Chloroaniline	< 0.66	0.66	
bis(2-Chloroethoxy)methane	< 0.33	0.33	
bis(2-Chloroethyl)ether	< 0.33	0.33	
bis(2-Chloroisopropyl)ether	< 0.33	0.33	
2-Chloronaphthalene	< 0.33	0.33	
2-Chlorophenol	< 0.33	0.33	
4-Chlorophenylphenyl ether	< 0.33	0.33	
Chrysene	< 0.33	0.33	
Dibenzo(a,h)anthracene	< 0.33	0.33	
Dibenzofuran	< 0.33	0.33	
1,2-Dichlorobenzene	< 0.33	0.33	
1,3-Dichlorobenzene	< 0.33	0.33	
1,4-Dichlorobenzene	< 0.33	0.33	
3,3-Dichlorobenzidine	< 0.66	0.66	
2,4-Dichlorophenol	< 0.33	0.33	
Diethylphthalate	< 0.33	0.33	
2,4-Dimethylphenol	< 0.33	0.33	
Dimethylphthalate	< 0.33	0.33	
Di-n-butylphthalate	< 0.33	0.33	
4,6-Dinitro-2-methylphenol	< 1.6	1.6	
2,4-Dinitrophenol	< 1.6	1.6	
2,4-Dinitrotoluene	< 0.33	0.33	
2,6-Dinitrotoluene	< 0.33	0.33	
Di-n-octylphthalate	< 0.33	0.33	
bis(2-Ethylhexyl)phthalate	< 0.33	0.33	
Fluoranthene	< 0.33	0.33	
Fluorene	< 0.33	0.33	
Hexachloro-1,3-butadiene	< 0.33	0.33	
Hexachlorobenzene	< 0.33	0.33	



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8270 QC continued...

	Method Blank Results (mg/kg)	Reporting Limit (mg/kg)	Flag
Hexachlorocyclopentadiene	< 0.33	0.33	
Hexachloroethane	< 0.33	0.33	
Indeno(1,2,3-cd)pyrene	< 0.33	0.33	
Isophorone	< 0.33	0.33	
2-Methylnaphthalene	< 0.33	0.33	
2-Methylphenol (o-Cresol)	< 0.33	0.33	
3&4-Methylphenol	< 0.66	0.66	
Naphthalene	< 0.33	0.33	
2-Nitroaniline	< 1.6	1.6	
3-Nitroaniline	< 1.6	1.6	
4-Nitroaniline	< 1.6	1.6	
Nitrobenzene	< 0.33	0.33	
2-Nitrophenol	< 0.33	0.33	
4-Nitrophenol	< 1.6	1.6	
N-Nitroso-di-n-propylamine	< 0.33	0.33	
N-Nitrosodiphenylamine	< 0.33	0.33	
Pentachlorophenol	< 1.6	1.6	
Phenanthrene	< 0.3	0.3	
Phenol	< 0.33	0.33	
Pyrene	< 0.33	0.33	
1,2,4-Trichlorobenzene	< 0.33	0.33	
2,4,5-Trichlorophenol	< 0.33	0.33	
2,4,6-Trichlorophenol	< 0.33	0.33	
2-Fluorophenol (surrogate)	78%		
Phenol-d6 (surrogate)	62%		
Nitrobenzene-d5 (surrogate)	72%		
2-Fluorobiphenyl (surrogate)	57%		
2,4,6-Tribromophenol (surrogate)	47%		
p-Terphenyl-d14 (surrogate)	86%		
Analysis Date/Time:	07-16-09/21:28		
Analyst Initials:	gjd		
Date Extracted:	7/16/2009		
Initial Sample Weight:	30 g		
Final Volume:	1.0 mL		

LCS/LCSD	LCS Results	LCS Concentration	LCSD Results	LCS Recovery	LCSD Recovery	RPD	Flag
Acenaphthene	44.63	50.00	43.13	89.3%	86.3%	3.3%	
4-Chloro-3-methylphenol	48.33	50.00	49.04	96.7%	98.1%	1.4%	
2-Chlorophenol	51.51	50.00	50.52	103.0%	101.0%	2.0%	
1,4-Dichlorobenzene	40.72	50.00	37.77	81.4%	75.5%	6.9%	
4,6-Dinitro-2-methylphenol	50.09	50.00	48.25	100.2%	96.5%	3.7%	
2,4-Dinitrophenol	38.77	50.00	43.17	77.5%	86.3%	10.0%	
2,4-Dinitrotoluene	37.66	50.00	38.61	75.3%	77.2%	2.3%	
2-Nitroaniline	48.05	50.00	47.84	96.1%	95.7%	0.4%	
3-Nitroaniline	43.45	50.00	42.90	86.9%	85.8%	1.2%	
4-Nitroaniline	46.71	50.00	46.12	93.4%	92.2%	1.2%	
4-Nitrophenol	40.50	100.00	41.68	40.5%	41.7%	1.8%	



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8270 QC continued...

N-Nitroso-di-n-propylamine	52.10	50.00	52.46	104.2%	104.9%	0.7%
Pentachlorophenol	45.95	50.00	45.67	91.9%	91.3%	0.6%
Phenol	51.73	50.00	51.09	103.5%	102.2%	1.3%
Pyrene	53.80	50.00	51.59	107.6%	103.2%	4.3%
1,2,4-Trichlorobenzene	24.03	50.00	23.13	48.1%	46.3%	2.8%
2,4,5-Trichlorophenol	26.92	50.00	26.57	53.8%	53.1%	1.0%
2-Fluorophenol (surrogate)	99%		110%			
Phenol-d6 (surrogate)	99%		91%			
Nitrobenzene-d5 (surrogate)	127%		118%			
2-Fluorobiphenyl (surrogate)	80%		78%			
2,4,6-Tribromophenol (surrogate)	43%		41%			
p-Terphenyl-d14 (surrogate)	47%		44%			
Analysis Date/Time:	07-16-09/21:59		07-16-09/21:59			
Analyst Initials:	gjd		gjd			
Date Extracted:	7/16/2009		7/16/2009			
Initial Sample Weight:	30 g		30 g			
Final Volume:	1.0 mL		1.0 mL			



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6010B/7470A TCLP Metals Quality Control Data

ENVision Batch Number: 072409icp / 072209hgw

<u>Method Blank (MB):</u>	<u>MB Results (mg/L)</u>	<u>Rep Lim (mg/L)</u>	<u>Flag</u>
Arsenic	< 0.01	0.01	
Barium	< 0.1	0.1	
Cadmium	< 0.005	0.005	
Chromium	< 0.01	0.01	
Lead	< 0.01	0.01	
Mercury	< 0.002	0.002	
Selenium	< 0.01	0.01	
Silver	< 0.05	0.05	

Analysis Date/Time: 07-24-09/08:11icp / 07-22-09/11:23hg

Analyst Initials: gjd

<u>Laboratory Control Standard (LCS):</u>	<u>LCS Results(mg/L)</u>	<u>LCS Conc(mg/L)</u>	<u>% Rec</u>	<u>Flag</u>
Arsenic	0.50	0.50	100	
Barium	0.51	0.50	102	
Cadmium	0.50	0.50	100	
Chromium	0.51	0.50	102	
Lead	0.50	0.50	100	
Mercury	0.0026	0.0025	104	
Selenium	0.50	0.50	100	
Silver	0.52	0.50	104	

Analysis Date/Time: 07-24-09/08:42icp / 07-22-09/11:27hg

Analyst Initials: gjd



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TCLP VOC Quality Control Data

ENVision Batch Number: 072209TCLP

<u>Method Blank (MB):</u>	<u>MB Results (ug/L)</u>	<u>Rep Lim (ug/L)</u>	<u>Flag</u>
Benzene	< 0.050	0.05	
Methyl ethyl ketone (MEK)	< 0.100	0.1	
Carbon Tetrachloride	< 0.050	0.05	
Chlorobenzene	< 0.050	0.05	
Chloroform	< 0.050	0.05	
1,2-Dichloroethane	< 0.050	0.05	
1,1-Dichloroethene	< 0.050	0.05	
Tetrachloroethene	< 0.050	0.05	
Trichloroethene	< 0.050	0.05	
Vinyl Chloride	< 0.100	0.1	
Dibromofluoromethane (surrogate)	102%		
1,2-Dichloroethane-d4 (surrogate)	82%		
Toluene-d8 (surrogate)	108%		
4-bromofluorobenzene (surrogate)	98%		
Analysis Date/Time:	07/22/09/06:28		
Analyst Initials	tjg		

<u>Laboratory Control Standard (LCS):</u>	<u>LCS Results (ug/L)</u>	<u>LCS Conc (ug/L)</u>	<u>% Rec</u>	<u>Flag</u>
Benzene	58.1	50	116%	
Methyl ethyl ketone (MEK)	117	125	94%	
Carbon Tetrachloride	40.5	50	81%	
Chlorobenzene	48.1	50	96%	
Chloroform	47.6	50	95%	
1,2-Dichloroethane	41.2	50	82%	
1,1-Dichloroethene	49.1	50	98%	
Tetrachloroethene	40.1	50	80%	
Trichloroethene	50.2	50	100%	
Vinyl Chloride	59.0	50	118%	
Dibromofluoromethane (surrogate)	93%			
1,2-Dichloroethane-d4 (surrogate)	94%			
Toluene-d8 (surrogate)	107%			
4-bromofluorobenzene (surrogate)	109%			
Analysis Date/Time:	07/22/09/05:42			
Analyst Initials				



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<u>Matrix Spike/Matrix Spike DUP:</u>	<u>Sample Results (ug/L)</u>	<u>MS Res (ug/L)</u>	<u>MSD Res (ug/L)</u>	<u>Spike Conc. ug/L</u>	<u>MS Rec</u>	<u>MSD Rec</u>	<u>% D</u>	<u>FLAG</u>
Benzene	0	57.4	57.9	50	115%	116%	0.87	
Methyl ethyl ketone (MEK)	0	126	143	125	101%	114%	12.6	
Carbon Tetrachloride	0	43.4	40.9	50	87%	82%	5.93	
Chlorobenzene	0	45.1	46.5	50	90%	93%	3.06	
Chloroform	0	46.5	47.7	50	93%	95%	2.55	
1,2-Dichloroethane	0	38.4	51.6	50	77%	103%	29.3	2
1,1-Dichloroethene	0	49.1	49.5	50	98%	99%	0.81	
Tetrachloroethene	0	37.8	35.7	50	76%	71%	5.71	
Trichloroethene	0	51.7	49.1	50	103%	98%	5.16	
Vinyl Chloride	0	60.2	62.4	50	120%	125%	3.59	
Dibromofluoromethane (surrogate)	104%	102%	96%					
1,2-Dichloroethane-d4 (surrogate)	86%	97%	89%					
Toluene-d8 (surrogate)	104%	111%	108%					
4-bromofluorobenzene (surrogate)	98%	100%	105%					
Analysis Date/Time:	07/22/09/09:56	07/22/09/10:19	07/22/09/10:42					
Analyst Initials	tjg	tjg	tjg					
Spiked sample number:	9-10003							



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8260 Quality Control Data

ENVision Batch Number: 071809VW

<u>Method Blank (MB):</u>	<u>MB Results (ug/L)</u>	<u>Rep Lim (ug/L)</u>	<u>Flag</u>
Acetone	< 100	100	
Acrolein	< 100	100	
Acrylonitrile	< 100	100	
Benzene	< 5	5	
Bromobenzene	< 5	5	
Bromochloromethane	< 5	5	
Bromodichloromethane	< 5	5	
Bromoform	< 5	5	
Bromomethane	< 5	5	
n-Butanol	< 50	50	
2-Butanone (MEK)	< 10	10	
n-Butylbenzene	< 5	5	
sec-Butylbenzene	< 5	5	
tert-Butylbenzene	< 5	5	
Carbon Disulfide	< 5	5	
Carbon Tetrachloride	< 5	5	
Chlorobenzene	< 5	5	
Chloroethane	< 5	5	
2-Chloroethylvinylether	< 50	50	
Chloroform	< 5	5	
Chloromethane	< 5	5	
2-Chlorotoluene	< 5	5	
4-Chlorotoluene	< 5	5	
1,2-Dibromo-3-chloropropane	< 5	5	
Dibromochloromethane	< 5	5	
1,2-Dibromoethane (EDB)	< 5	5	
Dibromomethane	< 5	5	
1,2-Dichlorobenzene	< 5	5	
1,3-Dichlorobenzene	< 5	5	
1,4-Dichlorobenzene	< 5	5	
trans-1,4-Dichloro-2-butene	< 100	100	
Dichlorodifluoromethane	< 5	5	
1,1-Dichloroethane	< 5	5	
1,2-Dichloroethane	< 5	5	
1,1-Dichloroethene	< 5	5	
cis-1,2-Dichloroethene	< 5	5	
trans-1,2-Dichloroethene	< 5	5	
1,2-Dichloropropane	< 5	5	
1,3-Dichloropropane	< 5	5	
2,2-Dichloropropane	< 5	5	
1,1-Dichloropropene	< 5	5	
cis-1,3-Dichloropropene	< 5	5	
trans-1,3-Dichloropropene	< 5	5	
Ethylbenzene	< 5	5	
Ethyl methacrylate	< 100	100	



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8260 QC Continued...

Method Blank (MB):	MB Results (ug/L)	Rep Lim (ug/L)
Hexachloro-1,3-butadiene	< 5	5
2-Hexanone	< 10	10
n-Hexane	< 10	10
Iodomethane	< 10	10
Isopropylbenzene (Cumene)	< 5	5
p-Isopropyltoluene	< 5	5
Methylene chloride	< 5	5
4-Methyl-2-pentanone (MIBK)	< 10	10
Methyl-tert-butyl-ether	< 5	5
Naphthalene	< 5	5
n-Propylbenzene	< 5	5
Styrene	< 5	5
1,1,1,2-Tetrachloroethane	< 5	5
1,1,2,2-Tetrachloroethane	< 5	5
Tetrachloroethene	< 5	5
Toluene	< 5	5
1,2,3-Trichlorobenzene	< 5	5
1,2,4-Trichlorobenzene	< 5	5
1,1,1-Trichloroethane	< 5	5
1,1,2-Trichloroethane	< 5	5
Trichloroethene	< 5	5
Trichlorofluoromethane	< 5	5
1,2,3-Trichloropropane	< 5	5
1,2,4-Trimethylbenzene	< 5	5
1,3,5-Trimethylbenzene	< 5	5
Vinyl acetate	< 10	10
Vinyl chloride	< 2	2
Xylene, M&P	< 5	5
Xylene, Ortho	< 5	5
Xylene (total)	< 10	10
Dibromofluoromethane (surrogate)	%	
1,2-Dichloroethane-d4 (surrogate)	%	
Toluene-d8 (surrogate)	%	
4-bromofluorobenzene (surrogate)	%	
Analysis Date/Time:		
Analyst Initials	tjg	



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8260 QC Continued...

<u>LCS/LCSD</u>	<u>LCS Results (ug/l)</u>	<u>LCS/LCSD Conc. (ug/l)</u>	<u>LCSD Result (ug/l)</u>	<u>LCS Rec.</u>	<u>LCSD Rec.</u>	<u>RPD</u>	<u>Flag</u>
Vinyl Chloride	55.9	50	57.4	112%	115%	2.6%	
1,1-Dichloroethene	45.4	50	50.4	91%	101%	10.4%	
trans-1,2-Dichloroethene	47.9	50	50.6	96%	101%	5.5%	
Methyl-tert-butyl-ether	45.9	50	47.5	92%	95%	3.4%	
1,1-Dichloroethane	53.3	50	50.8	107%	102%	4.8%	
cis-1,2-Dichloroethene	50.4	50	48.8	101%	98%	3.2%	
Chloroform	49.2	50	49.6	98%	99%	0.8%	
1,1,1-Trichloroethane	42.7	50	42.6	85%	85%	0.2%	
Carbon Tetrachloride	44.3	50	43.4	89%	87%	2.1%	
Benzene	58.6	50	57.2	117%	114%	2.4%	
Trichloroethene	53.6	50	58.6	107%	117%	8.9%	
Toluene	55.7	50	55.3	111%	111%	0.7%	
1,1,1,2-Tetrachloroethane	45.5	50	47.9	91%	96%	5.1%	
Chlorobenzene	49.5	50	52.1	99%	104%	5.1%	
Ethylbenzene	48.1	50	52.4	96%	105%	8.6%	
o-Xylene	54.5	50	53.5	109%	107%	1.9%	
N-propylbenzene	52.7	50	54.8	105%	110%	3.9%	
Dibromofluoromethane (surrogate)	90%		88%				
1,2-Dichloroethane-d4 (surrogate)	90%		80%				
Toluene-d8 (surrogate)	104%		98%				
4-bromofluorobenzene (surrogate)	108%		96%				
Analysis Date/Time:	07-17-09/17:53		07-17-09/18:16				
Analyst Initials	tjg		tjg				



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8270 Quality Control Data

ENVision Batch Number: 071609CW

BNA Method Blank (MB):	Method Blank Results (ug/L)	Reporting Limit (ug/L)	Flag
Aniline	< 10	10	
Benzoic Acid	< 50	50	
Benzyl Alcohol	< 20	20	
4-Bromophenylphenyl ether	< 10	10	
Butylbenzylphthalate	< 10	10	
Carbazole	< 20	20	
4-Chloro-3-methylphenol	< 20	20	
4-Chloroaniline	< 20	20	
bis(2-Chloroethoxy)methane	< 10	10	
bis(2-Chloroethyl)ether	< 10	10	
bis(2-Chloroisopropyl)ether	< 10	10	
2-Chloronaphthalene	< 10	10	
2-Chlorophenol	< 10	10	
4-Chlorophenylphenyl ether	< 10	10	
Dibenzofuran	< 10	10	
1,2-Dichlorobenzene	< 10	10	
1,3-Dichlorobenzene	< 10	10	
1,4-Dichlorobenzene	< 10	10	
3,3-Dichlorobenzidine	< 20	20	
2,4-Dichlorophenol	< 10	10	
Diethylphthalate	< 10	10	
2,4-Dimethylphenol	< 20	20	
Dimethylphthalate	< 10	10	
Di-n-butylphthalate	< 10	10	
4,6-Dinitro-2-methylphenol	< 50	50	
2,4-Dinitrophenol	< 50	50	
2,4-Dinitrotoluene	< 10	10	
2,6-Dinitrotoluene	< 10	10	
Di-n-octylphthalate	< 10	10	
bis(2-Ethylhexyl)phthalate	< 5	5	
Hexachloro-1,3-butadiene	< 10	10	
Hexachlorobenzene	< 5	5	
Hexachlorocyclopentadiene	< 25	25	
Hexachloroethane	< 10	10	
Isophorone	< 10	10	
2-Methylphenol (o-Cresol)	< 10	10	
3&4-Methylphenol	< 20	20	
2-Nitroaniline	< 50	50	
3-Nitroaniline	< 50	50	
4-Nitroaniline	< 50	50	
Nitrobenzene	< 10	10	
2-Nitrophenol	< 10	10	
4-Nitrophenol	< 50	50	
N-Nitroso-di-n-propylamine	< 10	10	
N-Nitrosodiphenylamine	< 10	10	

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8270 QC Continued...

	Method Blank Results (ug/L)	Reporting Limit (ug/L)	Flag
Pentachlorophenol	< 50	50	
Phenol	< 10	10	
1,2,4-Trichlorobenzene	< 10	10	
2,4,5-Trichlorophenol	< 10	10	
2,4,6-Trichlorophenol	< 10	10	
2-Fluorophenol (surrogate)	84%		
Phenol-d6 (surrogate)	97%		
Nitrobenzene-d5 (surrogate)	110%		
2-Fluorobiphenyl (surrogate)	69%		
2,4,6-Tribromophenol (surrogate)	36%		
p-Terphenyl-d14 (surrogate)	37%		
Analysis Date/Time:	07-20-09/11:03		
Analyst Initials:	gjd		
Date Extracted:	7/16/2009		
Initial Sample Volume:	1000 mL		
Final Volume:	1.0 mL		

PAH-SIM Method Blank (MB):	Method Blank Result (ug/L)	Reporting Limit (ug/L)	Flag
Acenaphthene	< 1.0	1.0	
Acenaphthylene	< 1.0	1.0	
Anthracene	< 0.10	0.10	
Benzo(a)anthracene	< 0.10	0.10	
Benzo(a)pyrene	< 0.10	0.10	
Benzo(b)fluoranthene	< 0.10	0.10	
Benzo(g,h,i)perylene	< 0.10	0.10	
Benzo(k)fluoranthene	< 0.10	0.10	
Chrysene	< 0.10	0.10	
Dibenzo(a,h)anthracene	< 0.10	0.10	
Fluoranthene	< 1.0	1.0	
Fluorene	< 1.0	1.0	
Indeno(1,2,3-cd)pyrene	< 0.022	0.022	
2-methylnaphthalene	< 1.0	1.0	
Naphthalene	< 1.0	1.0	
Phenanthrene	< 1.0	1.0	
Pyrene	< 1.0	1.0	
Analysis Date/Time:	07-20-09/09:29		
Analyst Initials	gjd		



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8270 QC continued...

LCS/LCSD	LCS Results	LCS Conc.	LCSD Results	LCS Recovery	LCSD Recovery	RPD	Flag
Acenaphthene	30.72	50.00	29.21	61.4%	58.4%	4.1%	
4-Chloro-3-methylphenol	34.68	50.00	33.63	69.4%	67.3%	2.7%	
2-Chlorophenol	17.45	50.00	20.22	34.9%	40.4%	9.5%	
1,4-Dichlorobenzene	13.03	50.00	14.17	26.1%	28.3%	4.4%	
4,6-Dinitro-2-methylphenol	42.89	50.00	39.17	85.8%	78.3%	8.5%	
2,4-Dinitrophenol	46.33	50.00	47.15	92.7%	94.3%	1.7%	
2,4-Dinitrotoluene	30.05	50.00	29.48	60.1%	59.0%	1.6%	
2-Nitroaniline	43.67	50.00	43.12	87.3%	86.2%	1.2%	
3-Nitroaniline	25.73	50.00	26.54	51.5%	53.1%	2.4%	
4-Nitroaniline	27.66	50.00	26.78	55.3%	53.6%	2.5%	
4-Nitrophenol	31.26	100.00	30.95	31.3%	31.0%	0.6%	
N-Nitroso-di-n-propylamine	39.23	50.00	39.86	78.5%	79.7%	1.5%	
Pentachlorophenol	30.68	50.00	31.57	61.4%	63.1%	2.4%	
Phenol	27.06	50.00	31.43	54.1%	62.9%	12.1%	
Pyrene	45.10	50.00	45.94	90.2%	91.9%	1.8%	
1,2,4-Trichlorobenzene	10.40	50.00	11.35	20.8%	22.7%	4.0%	
2,4,5-Trichlorophenol	16.88	50.00	17.67	33.8%	35.3%	2.8%	
2-Fluorophenol (surrogate)	34%		63%				
Phenol-d6 (surrogate)	56%		87%				
Nitrobenzene-d5 (surrogate)	69%		108%				
2-Fluorobiphenyl (surrogate)	53%		60%				
2,4,6-Tribromophenol (surrogate)	30%		34%				
p-Terphenyl-d14 (surrogate)	50%		54%				
Analysis Date/Time:	07-20-09/11:33		07-20-09/12:04				
Analyst Initials:	gjd		gjd				
Date Extracted:	7/16/2009		7/16/2009				
Initial Sample Volume:	1000 mL		1000 mL				
Final Volume:	1.0 mL		1.0 mL				



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<u>Flag Number</u>	<u>Comments</u>
1	Reported value is estimated due to linear range exceedence. GJD 07-16-09
2	RPD is biased high but recoveries are within control.



COC# 5756

(317) 685-6600 - FAX (317) 685-6610

[illegible]

ATTACHMENT 2



Western Tar

2525 Prairieton Road
Terre Haute, IN 47802

Inquiry Number: 2646891.4
December 01, 2009

The EDR Aerial Photo Decade Package

EDR Aerial Photo Decade Package

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Date EDR Searched Historical Sources:

Aerial Photography December 01, 2009

Target Property:2525 Prairieton Road
Terre Haute, IN 47802

<u><i>Year</i></u>	<u><i>Scale</i></u>	<u><i>Details</i></u>	<u><i>Source</i></u>
1952	Aerial Photograph. Scale: 1"=1000'	Panel #: 2439087-D4/Flight Date: September 04, 1952	EDR
1972	Aerial Photograph. Scale: 1"=500'	Panel #: 2439087-D4/Flight Date: April 04, 1972	EDR
1977	Aerial Photograph. Scale: 1"=1000'	Panel #: 2439087-D4/Flight Date: May 09, 1977	EDR
1984	Aerial Photograph. Scale: 1"=1000'	Panel #: 2439087-D4/Flight Date: May 15, 1984	EDR
1987	Aerial Photograph. Scale: 1"=1000'	Panel #: 2439087-D4/Flight Date: June 18, 1987	EDR
1992	Aerial Photograph. Scale: 1"=750'	Panel #: 2439087-D4/Flight Date: March 24, 1992	EDR
1998	Aerial Photograph. Scale: 1"=750'	Panel #: 2439087-D4/Flight Date: February 24, 1998	EDR
2005	Aerial Photograph. 1" = 604'	Flight Year: 2005	EDR
2006	Aerial Photograph. 1" = 604'	Flight Year: 2006	EDR

INQUIRY #: 2646891.4

YEAR: 1952



| = 1000'





INQUIRY #: 2646891.4

YEAR: 1972

| = 500'





INQUIRY #: 2646891.4

YEAR: 1977

| = 1000'





INQUIRY #: 2646891.4

YEAR: 1984

| = 1000'





INQUIRY #: 2646891.4

YEAR: 1987

| = 1000'





INQUIRY #: 2646891.4

YEAR: 1992

| = 750'





INQUIRY #: 2646891.4

YEAR: 1998

| = 750'





INQUIRY #: 2646891.4

YEAR: 2005

| = 604'





INQUIRY #: 2646891.4

YEAR: 2006

| = 604'





Western Tar

2525 Prairieton Road
Terre Haute, IN 47802

Inquiry Number: 2646891.3
November 30, 2009

Certified Sanborn® Map Report

Certified Sanborn® Map Report

11/30/09

Site Name:

Western Tar
2525 Prairieton Road
Terre Haute, IN 47802

Client Name:

Keramida Environmental, Inc.
401 N. College Avenue
Indianapolis, IN 46202



Environmental Data Resources Inc

EDR Inquiry # 2646891.3

Contact: Chris Shaw

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Certified Sanborn Results:

Site Name: Western Tar
Address: 2525 Prairieton Road
City, State, Zip: Terre Haute, IN 47802
Cross Street:
P.O. # NA
Project: 3268B-002
Certification # 4802-4C62-B8B3



Sanborn® Library search results
Certification # 4802-4C62-B8B3

Maps Provided:

1972
1963
1955

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- ☒ University Publications of America
- ☒ EDR Private Collection

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- All maps are now displayed at a uniform scale. This makes it easier for you to view changes to the property over time.
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For more information about the new enhancements to the Certified Sanborn Map Report, contact your EDR representative at 800-352-0050.

Sanborn Sheet Thumbnails

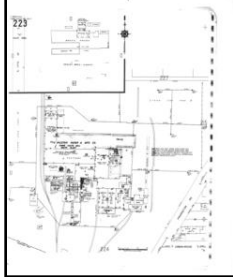
This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.



1972 Source Sheets



Volume 2, Sheet 224



Volume 2, Sheet 223

1963 Source Sheets



Volume 2, Sheet 224



Volume 2, Sheet 223

1955 Source Sheets



Volume 2, Sheet 224



Volume 2, Sheet 223

1972 Certified Sanborn Map

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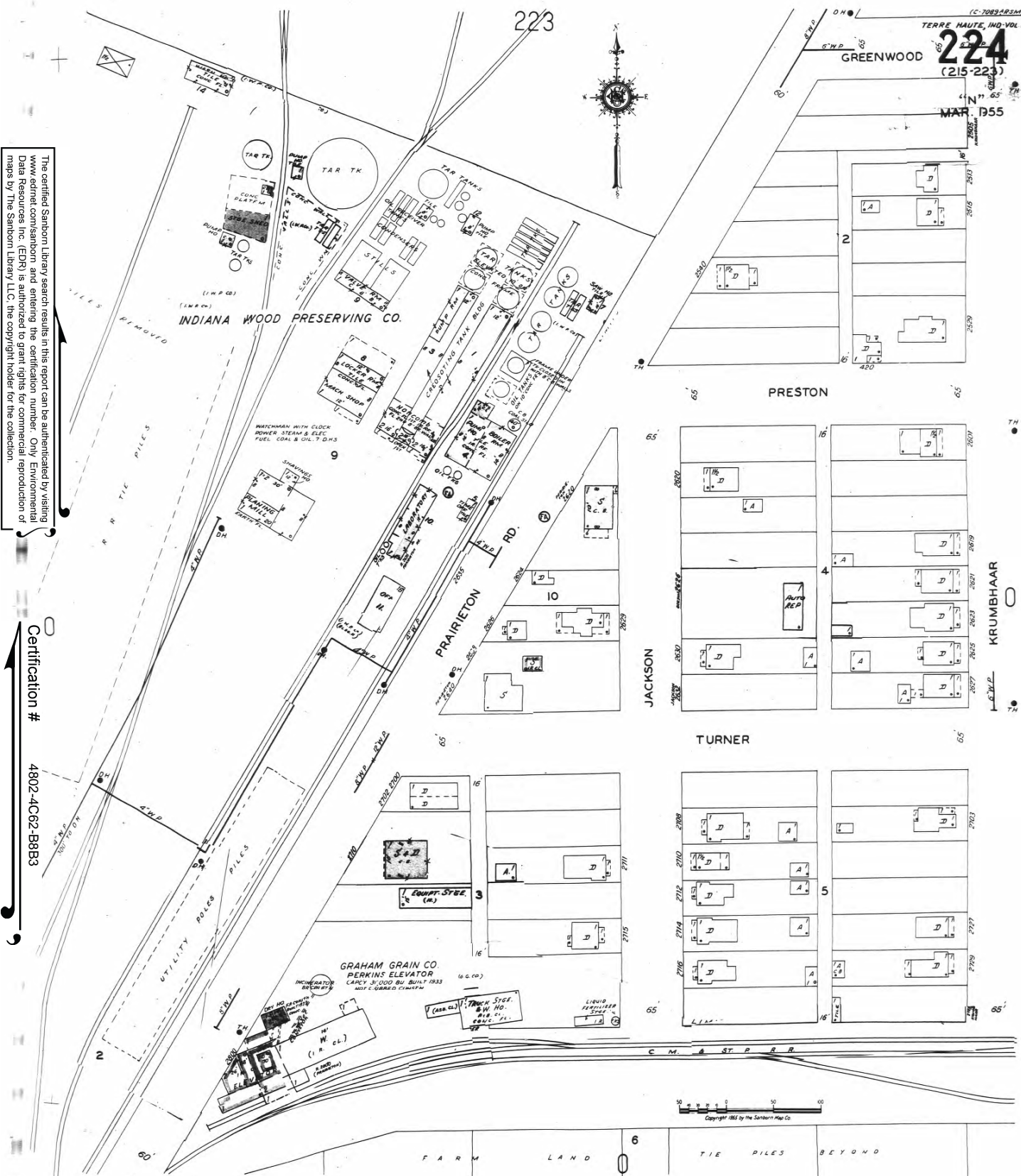
Certification #

4802-4C62-B8B3

Site Name: Western Tar
Address: 2525 Prairieion Road
City, ST, ZIP: Terre Haute IN 47802
Client: Karamida Environmental, Inc.
EDR Inquiry: 2646891.3
Order Date: 11/30/2009 5:51:02 PM
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Site Name: Western Tar
 Address: 2525 Prairieon Road
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 Client: Keramida Environmental, Inc.
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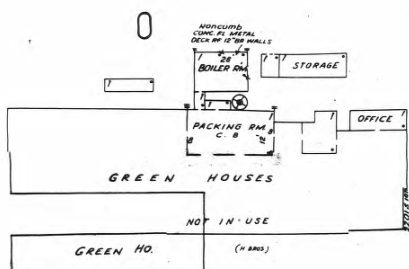


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 TERRE HAUTE, IND VOL 2

223

MAR. 1955

S. 17TH ST.



HENLEY BROS. - FLORISTS

227

STRAW STGE YARD 'B'

215

THE WESTON PAPER & MFG CO.
 TERRE HAUTE MILL
 SOUTH PLANT

2 FACTORY

224

PRAIRIEON RD

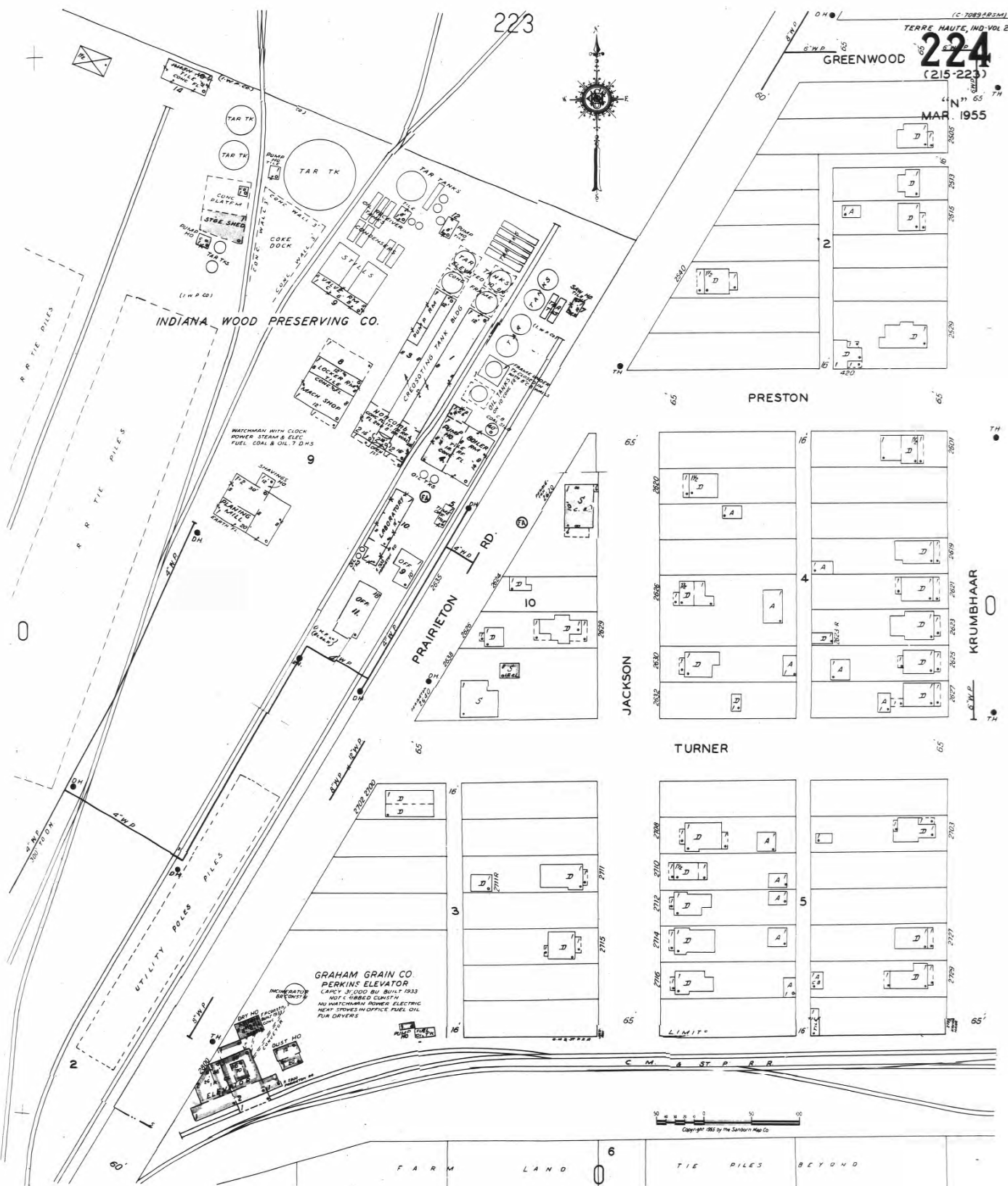
GREENWOOD

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Certification # 4802-4C62-B8B3



1963 Certified Sanborn Map

Site Name: Western Tar
 Address: 2525 Prairieon Road
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223

MAR. 1955

S. 17TH ST.

STRAW STEE YARD 'A'

GREEN HOUSES

HENLEY BROS. - FLORISTS

227

WIRE FENCE

STRAW STEE YARD 'B'

215

THE WESTON PAPER & MFG CO.
 TERRE HAUTE DIVN.
 SOUTH PLANT

2 FACTORY

MACH SHOP

224

WATCHMAN WITH CLOCK POWER STEAM & ELEC I.E.P.
 HEAT STEAM FUEL COAL PRIVATE WATER SUPPLY FROM
 4 DEEP WELLS & ELEC DEEP WELL PUMPS TOTAL CAPACITY
 3,000 G.P.M. 1-ALLIS CHALMERS FIRE PUMP CAPACITY 1,500 G.P.M.
 1-300,000 G.P.M. SUCTION TANK ON GROUND 175,000 G.P.M. W.P.
 ELEV. 100' ON STEEL TOWER. 21 PRIPLE HYDOS & 4,200 2 1/2" HOSE
 AUTOMATIC SPRINKLERS AS SHOWN.

PRAIRIETON RD.

GREENWOOD

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1955 Certified Sanborn Map

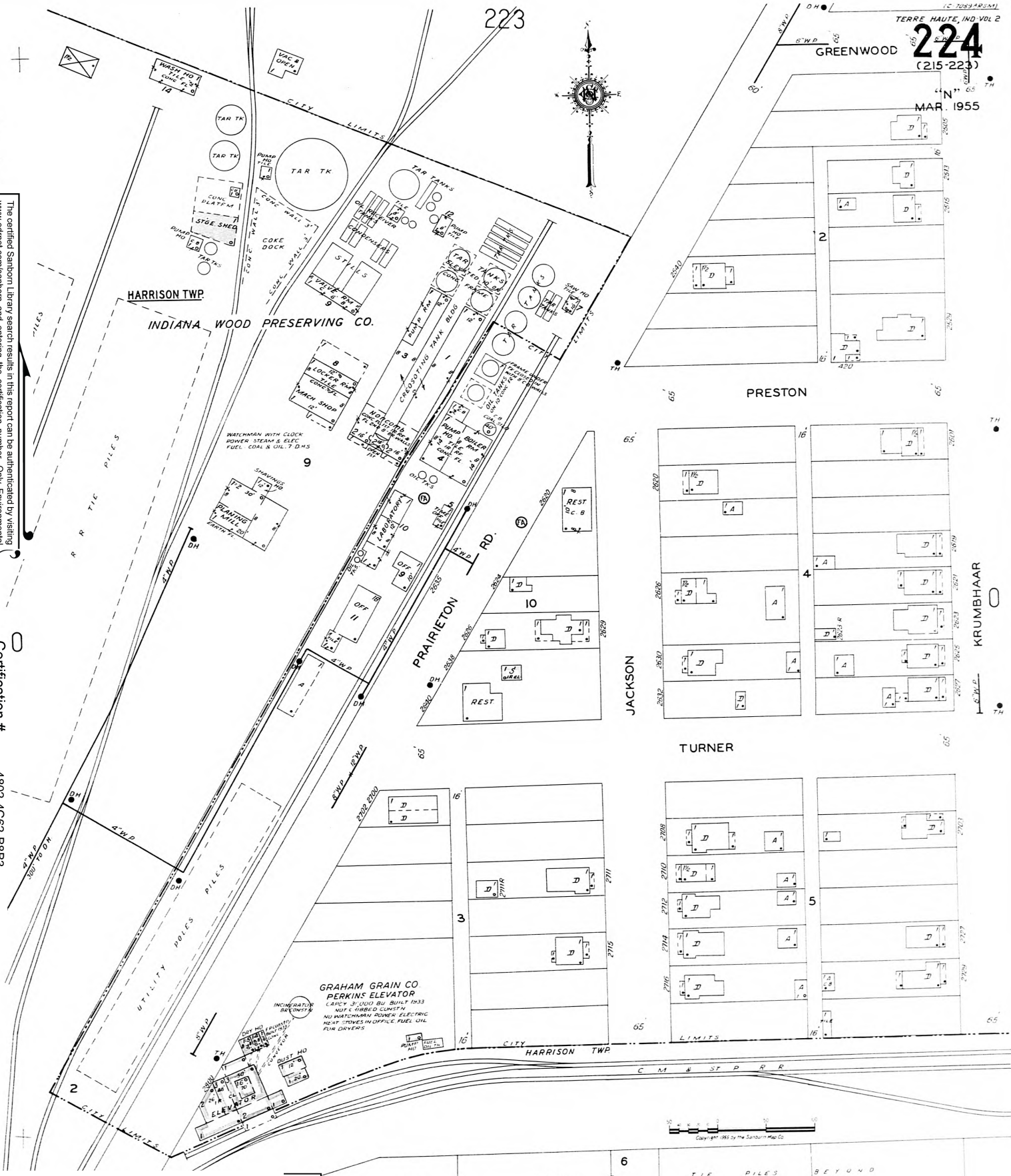
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Certification # 4802-4C62-B8B3

Site Name: Western Tar
Address: 2525 Prairieton Road
City, ST, ZIP: Terre Haute IN 47802
Client: Keramida Environmental, Inc.
EDR Inquiry: 2646891.3
Order Date: 11/30/2009 5:51:02 PM
Certification #: 4802-4C62-B8B3



Copyright: 1955



ATTACHMENT 3

Quality Management Plan

For

**KERAMIDA INC.
401 North College Avenue
Indianapolis, Indiana, 46202**

**Revised
October 2009**

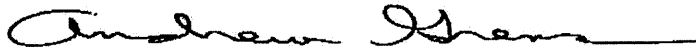
Quality Management Plan Approval Page



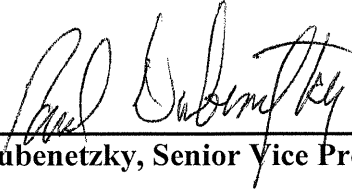
Vasiliki Keramida, Ph.D., President & CEO



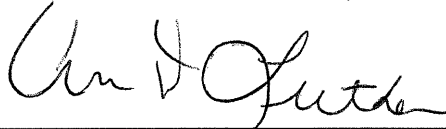
Douglas B. Zabonick, P.E., Senior Vice President



Andrew Gremos, L.P.G., C.H.M.M., Senior Vice President



Paul Dubenetzky, Senior Vice President



Ann D. Luther, P.E., Senior Quality Manager

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ATTACHMENTS

- 1 Figure 1: Management Organizational Chart
- 2 KERAMIDA Project Management Policy
- 3 Master Services Agreement

1.0 INTRODUCTION

KERAMIDA Inc. (KERAMIDA) is a full service environmental consulting firm with offices in Cincinnati, Ohio, Charleston, South Carolina, Sacramento, California, Abu Dhabi and Greece with the headquarters in Indianapolis, Indiana. Established in 1988 KERAMIDA is a woman owned business enterprise. KERAMIDA separates itself by providing superior quality in our work efforts. Our commitment to quality is evidenced by the reviews and procedures in place on all our projects. KERAMIDA continues to update these methods and procedures to provide the client a competitive and high quality project.

KERAMIDA has the capabilities to perform various environmental services including, but not limited to, Phase I Environmental Site Assessments, Phase II Studies, Groundwater Modeling, Remediation, Asbestos/Lead/Mold Services, Wetlands, NEPA studies, Air Permitting, Air Dispersion Modeling, Energy Analysis, and Litigation support services. This Quality Management Plan (QMP) has been prepared to meet the environmental and construction contracting requirements described in EPA QA/R-2, EPA Requirements for Quality Management Plans, March 2001. KERAMIDA's QMP was originally issued in 2006 and has been updated periodically to reflect organizational changes.

2.0 QUALITY POLICY

KERAMIDA management is committed to providing the highest quality consulting services to our clients. This commitment to quality is demonstrated in our work product. KERAMIDA partners with our clients to provide a level and quality of service that both meets and exceeds client specifications. A high level of senior management involvement and review in every project ensures a quality work product.

3.0 QUALITY MANAGEMENT PLAN CONTENTS

3.1 CONTENT

This QMP documents management practices, including QA and QC activities, used to ensure that the technical work performed by KERAMIDA are of the type and quality needed for their intended use.

Accordingly, the Quality Management Plan documents:

- the mission and quality policy of the organization;
- the specific roles, authorities, and responsibilities of management and staff with respect to QA and QC activities;
- the means by which effective communications with personnel actually performing the work are assured;

- the processes used to plan, implement, and assess the work performed;
- the process by which measures of effectiveness for QA and QC activities will be established and how frequently effectiveness will be measured; and
- the continual improvement based on lessons learned from previous experience.

3.2 MANAGEMENT AND ORGANIZATION

The overall purpose of this QMP is to document the KERAMIDA quality policy as it applies to consulting and contract services and to describe management's responsibilities in implementing and overseeing the KERAMIDA QMP.

The QMP is signed by the President & CEO, senior management staff, and the Senior Quality Manager. By signing this document the senior management staff agrees to implement the policy set forth in this document. The senior staff involvement in every KERAMIDA project also ensures that the quality of the work product meets the requirements of the KERAMIDA Quality Policy. Any modification to the QMP requires the same approval process as the original plan.

The QA activities are an essential part of providing clients consulting services that represent the best quality reports and services. These activities include senior staff involvement in every project to ensure the resources, both project hours and funding, are available to complete the project in an accurate and cost effective manner. The Senior Quality Manager reports to the President & CEO to provide top management support for the KERAMIDA QMP. The attached management organizational chart, Figure 1, Attachment 1, depicts the reporting structure of the Senior Quality Manager.

3.2.1 Senior Quality Manager

The Senior Quality Manager's duties include the following:

- To review project proposals to ensure that they meet KERAMIDA report policies.
- To provide project oversight as required for coordination purposes.
- To provide project report and data summary review in addition to senior management review.
- To update the President & CEO and Senior Vice Presidents of any quality related issues with client work products.

The implementation of, and adherence to, the QMP is the responsibility of every KERAMIDA employee.

3.3 QUALITY SYSTEM COMPONENTS

The QMP at KERAMIDA involves every employee at KERAMIDA. Senior management's role in the process is documented in the attached KERAMIDA "Project Management Policy" (Attachment 2).

3.3.1 Project Proposal Process

The quality system starts with the process of supplying project proposals to clients and includes the following:

- Each proposal is required to have a worksheet that includes the numbers of hours of each type of technical expertise required to fulfill the requirements of the project scope.
- Every client proposal is co-signed by a Senior Vice President to ensure the accuracy of the proposal process.
- Each proposal is required to be reviewed by the Senior Quality Manager.

3.3.2 Project Implementation

Once a project is approved by the client it is set up by KERAMIDA accounting personnel and additional procedures ensure the proper implementation of the project as follows:

- A project manager is assigned to oversee the implementation of the project.
- Monthly project activities are summarized and reviewed by the project manager.
- Major projects are reviewed on a weekly basis by area Vice Presidents to ensure that projects are being completed in a timely manner and that the work is being performed to the quality required of the end product. Major projects are those that involved multiple technical disciplines on the same project.
- If the project being completed requires a Quality Assurance Project Plan (QAPP), one is completed under the direction of the Senior Quality Manager and a Senior Vice President. The Senior Quality Manager ensures that the QAPP is being followed. A template of the KERAMIDA QAPP is included as a reference.

3.3.3 Project Work Product

Once a project is completed the following procedures are implemented to guarantee the quality of the work product:

- The data sheets, summaries, and reports are prepared by KERAMIDA technical staff with the assistance of the project managers.

- Completed project data sheets, summaries, and draft reports are reviewed by area Vice Presidents and the Senior Quality Manager in accordance with the Project Management Policy.
- Final project reports with all accompanying data and summaries will require the signature of the technical staff and the area vice president.

This system of checks and balances ensures that any work product delivered to clients is reviewed by one or more members of Senior Management. In addition to the specific requirements mentioned above the overall KERAMIDA QMP will adhere to the following requirements:

- The QMP will be reviewed on an annual basis by the Senior Quality Manager. This review will be documented and covered with the senior management group.
- The need for any additional quality training will be assessed on an annual basis as well as overall employee training requirements are a part of the employee's annual performance reviews.
- All field personnel will receive instruction on the KERAMIDA "Field Operations Training Program" on an annual basis after their initial certification.
- Senior Project Managers are required to perform a peer review audit of a minimum of two projects on an annual basis.

The Senior Quality Manager will work with the area vice presidents to make sure that quality reviews and appropriate corrective measures take place in a timely manner.

3.4 PERSONNEL QUALIFICATION AND TRAINING

KERAMIDA maintains a technical staff that is both well trained and experienced in the technical fields necessary to fulfill client needs. Section 8.0, Environmental Staff Qualifications and Training, contains a summary of the qualifications and training of KERAMIDA technical staff. KERAMIDA technical staff's training needs are reviewed by area Vice Presidents on an annual basis during technical staff performance reviews. KERAMIDA Field Operations Training Program is attached for review and is covered with field personnel on a project by project basis. Specific training for both remedial measures and professional growth are evaluated annually and incorporated into the annual review process performed by Senior Management. The Senior Vice Presidents and work group leaders are responsible for:

- Identifying, ensuring, and documenting that personnel have and maintain the appropriate knowledge, skill, and statutory, regulatory, professional or other certifications, accreditations, licenses, or other formal qualification necessary.
- Identifying the need for retraining based on changing requirements.

3.5 PROCUREMENT OF ITEMS AND SERVICES

KERAMIDA recognizes the need for purchasing high quality goods and services that meet the highest technical and scientific standards. KERAMIDA has a rigorous procurement review process to ensure that goods and services purchased by KERAMIDA are necessary and meet all the technical specifications and requirements for the tasks for which they are being procured. Project Managers perform the initial quality assurance prior to submitting a request for purchase of goods or services. The purchase request is reviewed by the appropriate Senior Vice President to:

- Confirm that the Project Manager has verified, to the extent possible, that the vendor providing the good or service requested is properly certified or accredited to perform the tasks, or that the goods purchased carry assurance of quality performance and adherence to required specifications.
- Confirm that the purchase will be charged to the correct account and that adequate funding is available.

Vendors supplying services are subject to additional quality review by the Vice President of Operations and are required to execute a Master Services Agreement (MSA) with standard terms and conditions. (See attached sample MSA.) The MSA includes insurance requirements and contractual language to address the quality of services provided and remedial measures in the event of unsatisfactory performance or delivery of services. MSA's are reviewed on an annual basis by the Vice President of Operations and Senior Vice Presidents. Vendors deemed unsatisfactory are removed from the approved list of vendors. Vendors supplying goods and services procured for a specific project are instructed via a standardized work order (referenced in the MSA) to assign the project number (supplied by the project manager) to all invoices and documentation. Upon receipt of the documentation, the appropriate Project Manager verified the quantity, quality and pricing of the goods and/or services supplied and gives the invoice to the Vice President of Operations for processing.

3.6 DOCUMENTS AND RECORDS

Upon acceptance of a proposal, 'hard' files are prepared in accordance with the following methodology. Primary files are assigned a unique project number using an automatic, electronic numbering system. Sub-files required for projects and their folders are shown in the following table.

Phase I (Color Folders):	Phase II (Color Folders):
Contracts (Yellow)	Contracts (Yellow)
Correspondence (Blue)	Correspondence (Blue)
EDR (Pink)	Eng/Out of Scope (Maroon)
City Directories (Dark Blue)	Permits & Waste (Gray)
Graphics (Green)	Graphics (Green)
Well Records (Lavender)	Health & Safety (Manila)
Sanborns (Teal)	Lab Data (Orange)
Site Visit (Purple)	Site Visit (Purple)
Agency Correspondence (Manila)	Agency Correspondence (Manila)

Electronic files are created on a shared electronic drive. Active files are maintained by the Project Manager from the initiations of the project until final production of documents. Draft copies of all documents, including electronic media are destroyed upon completion of the project.

Procedural records and inactive client files are maintained by the KERAMIDA administrative staff. Inactive client files are maintained by project number. Active client files are maintained by the technical staff in the active areas of the KERAMIDA office by client name.

Procedural records and client electronic records are kept on shared server drives for active clients with nightly back-ups of server hard drives. Inactive client files are transferred to DVDs and maintained by the administrative staff. Printed copies are stored on-site at the appropriate regional office. Electronic media are stored on-site with duplicate copies stored at an off-site location.

The document control process is maintained by the Vice President of Operations.

Documents produced under the provisions of Attorney-Client Privilege or considered confidential due to specific contractual language are filed within the main client directory in separate files labeled as "Privileged and Confidential". All files are considered confidential in accordance with the Terms and Conditions of our proposal agreements.

3.7 COMPUTER HARDWARE AND SOFTWARE

KERAMIDA's computer software and hardware needs are met through a service contract with an outside information technology (IT) firm that maintains and supplies equipment to KERAMIDA offices. The IT firm reports to the Vice President of Operations, who has the ultimate responsibility of providing for KERAMIDA's hardware and software needs. The Vice President of Operations receives input from the operating Senior Vice Presidents at senior staff meetings which take place on a weekly basis. Mainframe shared drives are backed up on a daily basis to make sure that client files are protected. The Vice President of Operations and the IT

firm are the only authorized Administrators for the system and, as such, are the only parties capable of adding software to the system.

Input from clients, KERAMIDA technical staff, and professional associations are used to judge the hardware and software needs of the technical staff in meeting the needs of KERAMIDA and its clients.

3.8 PLANNING

KERAMIDA recognizes that proper planning is key to achieving project objectives and emphasizes the involvement of experienced personnel from the creation of a proposal through the completion of the project. In consultation with the appropriate Senior Vice President, the assigned Project Manager is responsible for:

- Planning environmental data operations using a systematic planning process which includes:
 - the identification and involvement of the project manager, sponsoring organization and responsible official, project personnel, stakeholders, scientific experts, customers and suppliers;
 - a description of the project goal, objectives, and questions and issues to be addressed;
 - the identification of project schedule, resources, milestones, and any applicable requirements such as regulatory and contractual requirements;
 - the identification of the type and quantity of data needed and how the data will be used to support the project's objectives;
 - the specification of performance criteria for measuring quality;
 - the specification of needed QA and QC activities to assess the quality performance criteria;
 - a description of how, when, and where the data will be obtained (including existing data) and identification of any constraints on data collection; and
 - a description of how the acquired data will be analyzed (either in the field or the laboratory), evaluated for QA review, verification, validation, and assessed against its intended use and the quality performance criteria;

All aspects of the project plan including the QAPP are reviewed and agreed upon by the Project manager and Senior Vice President.

Where applicable, KERAMIDA has developed Standard Operating Procedures (SOPs) for processes that are repetitive in nature. SOPs are developed through the consensus of those performing the task and managers responsible for the completion of those tasks. The use of SOPs in conjunction with an appropriate QAPP and Senior Vice President reviews are considered the keys to creating a proper project plan.

Weekly meetings on major projects make sure all members of the project team as well as the area Senior Vice President are involved in all aspects of the project to make sure that project quality is maintained.

3.9 IMPLEMENTATION OF WORK PROCESS

As indicated previously, KERAMIDA considers involvement by senior personnel to be of utmost importance. Once the project has been planned the work is performed in accordance with the specified plan using the specified QAPP, SOPs or project specifications. The Project Manager, with oversight by the Senior Vice President is responsible for:

- ensuring the work is performed according to approved planning and technical documents;
- identification of operations needing procedures such as standardized, special, or critical operations, preparation including form, content, and applicability, review, approval, revision, and withdrawal of these procedures; and policy for use; and,
- controlling and documenting the release, change, and use of planned procedures, including any necessary approvals, specific times and points for implementing changes, removal of obsolete documentation from work areas, and verification that the changes are made as prescribed.

KERAMIDA uses a written work order process to ensure tasks are performed in accordance with the project specifications. Potential deviations from the plan are discussed with the Project Manager and Senior Vice President prior to implementation and decisions documented accordingly. Project meetings are scheduled as appropriate for the project and may include varying staff levels to ensure project objectives are met and specified procedures are being utilized. SOP's are reviewed, a minimum, annually by the senior management. Changes to SOP's or other specified procedures are communicated to divisional staff via weekly staff meetings and e-mail notifications. Monthly all-staff meetings are also used to communicate changes to procedures.

Area Senior Vice Presidents are responsible for making sure that area technical staff properly maintains project files. Inactive files are moved to storage areas where they are maintained by project member. Inactive electronic files are copied to DVDs and maintained by the administrative staff.

3.10 ASSESSMENT AND RESPONSE

The Senior Quality Manager is responsible for determining the suitability and effectiveness of the implemented quality system by performing the following:

- assessing the adequacy of the quality system at least annually;

- planning, implementing, and documenting assessments and reporting assessment results to management including how to select an assessment tool, the expected frequency of their application to environmental programs, and the roles and responsibilities of assessors;
- determining the level of competence, experience, and training necessary to ensure that personnel conducting assessments are technically knowledgeable, have no real or perceived conflict of interest, and have no direct involvement or responsibility for the work being assessed;
- ensuring that personnel conducting assessments have sufficient authority, access to programs, managers, documents, and records, and organizational freedom to:
 - identify both quality problems and noteworthy practices, propose recommendations for resolving quality problems; and,
 - independently confirm implementation and effectiveness of solutions;
- management's review and response to findings;
- identifying how and when corrective actions are to be taken in response to the findings of the assessment, ensuring corrective actions are made promptly, confirming the implementation and effectiveness of any corrective action, and documenting (including the identification of root causes, the determination of whether the problem is unique or has more generic implications, and recommendation of procedures to prevent recurrence) such actions; and,
- addressing any disputes encountered as a result of assessments.

The primary assessment tools used to evaluate the quality system consist of:

- Peer reviews coordinated/facilitated by the Senior Quality Manager and the appropriate Senior Vice President.
- Technical reviews coordinated by the Senior Quality Manager and conducted by appropriate internal or external technical experts.
- Performance evaluations coordinated by the Senior Quality manager and conducted by the appropriate working group leader and Senior Vice President.

The Senior Quality Manager is responsible for ensuring that the QMP is reviewed at least annually and that the plan is up to date and adequately addressing the quality requirements of KERAMIDA and its clients. More frequent reviews and changes may be required if major deficiencies are noted prior to the annual review. This review will include reviewing any identified deficiencies in the quality systems and suggested changes to correct identified deficiencies. A summary of the assessment will be given to the senior management staff along with recommended revisions to the QMP. Any client feedback from project deliverables along with the results of senior staff reviews of project deliverable will be used to determine the adequacy of the current QMP.

3.11 QUALITY IMPROVEMENT

It is the responsibility of all KERAMIDA employees to notify the Senior Quality Manager or Senior Vice President of any identified conditions that are adverse to quality. The Senior Quality is responsible for ensuring that conditions adverse to quality are:

- ensuring that conditions adverse to quality are:
 - prevented;
 - identified promptly including a determination of the nature and extent of the problem;
 - corrected as soon as practical, including implementing appropriate corrective actions and actions to prevent reoccurrence;
 - documenting all corrective actions; and,
 - tracking such actions to closure.

All corrective actions will be documented in the affected SOP or policy. Continuous improvement will be achieved through:

- on-going training;
- implementation of QAPPs and SOPs as planning tools;
- continuous review and assessment of the quality system; and,
- involvement in trade associations and pertinent industry groups.

4.0 REFERENCES

- “EPA Requirements for Quality Management Plans,” 2001 (EPA QA/R-2)
- “QEP Reviews,” 2001 (EPA)

5.0 ENVIRONMENTAL SERVICES STAFF QUALIFICATIONS AND TRAINING

KERAMIDA principals have worked for over 20 years in the environmental field and offer extensive technical expertise coupled with regulatory savvy and business know-how. Our technical and regulatory expertise has positioned KERAMIDA as a leader in providing a full range of services to businesses, industry, and public sector clients. The firm’s technical staff possess certifications and registrations in over 30 different areas of expertise and hold three patents and over 20 M.S. and Ph.D. degrees. Senior-level staff are always directly engaged in projects to ensure the highest quality products, on time, and within budget.

The KERAMIDA environmental services team has unparalleled experience in the areas of site investigation/remediation; asbestos/mold/lead assessments and mitigation; industrial hygiene/indoor air quality; health and safety; environmental compliance; environmental management systems; ecological and human health risk assessments; wetlands identification; hydrological evaluation; air, water, and waste resources management; contaminant investigations and remediation; permitting; regulatory compliance; audits; air quality management, permitting

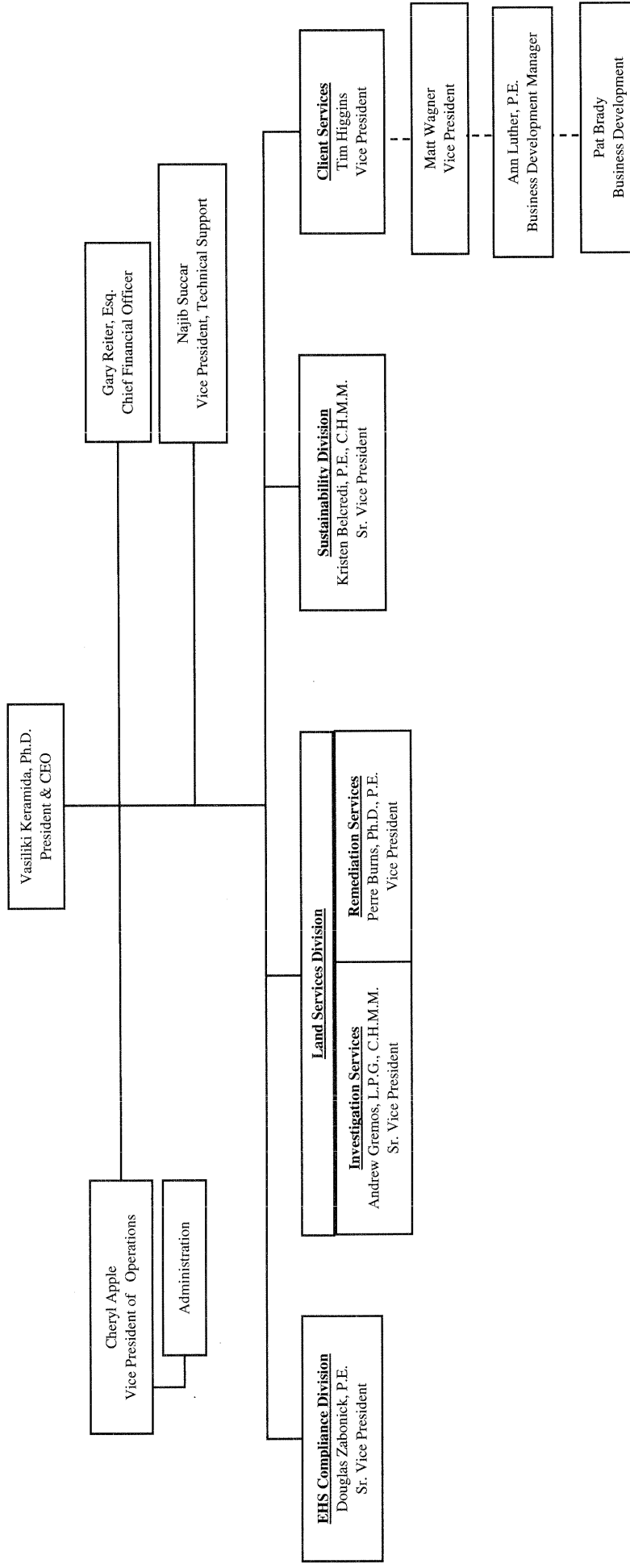
and modeling; field services; and strategy development. The KERAMIDA team has proven experience serving public and private and public sector client nationwide in all technical services areas. Our team has conducted hundreds of Phase I assessments and Phase II investigations, indoor air quality projects, industrial hygiene and health and safety, air quality management, permitting and modeling; and remediation of contaminated properties.

KERAMIDA engages senior engineers and scientists in all aspects of projects, ensuring the highest quality product while being focused on the reduction of liability concerns of our clients. All projects and associated reports undergo intensive quality review by senior members of the KERAMIDA Team. In addition to this core environmental services team, KERAMIDA draws on the support of other senior staff, engineers, and scientists as needed.

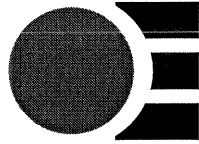
ATTACHMENT 1

FIGURE 1: MANAGEMENT ORGANIZATIONAL CHART

KERAMIDA INC. ORGANIZATIONAL CHART



ATTACHMENT 2
KERAMIDA PROJECT MANAGEMENT POLICY



KERAMIDA

ENVIRONMENT • HEALTH • SAFETY
AIR - LAND - WATER - WASTE

06/16/2005

KERAMIDA ENVIRONMENTAL, INC.

PROJECT MANAGEMENT POLICY

1. Senior President involved in every proposal.
2. Senior Vice President co-signs every proposal with Project Manager.
3. Senior Vice President responsible for scope and execution.
4. Senior Vice President, reviews data, discusses conclusion and recommendations with Project Manager.
5. Project Manger generates draft report for review.
6. Senior Vice President, reviews report for technical substance
7. Technical writing by Senior Quality Manager
8. Senior Vice President performs second review of corrected report (final).
9. Senior Vice President signs final report.

ATTACHMENT 3
MASTER SERVICES AGREEMENT



**KERAMIDA INC.
Master Agreement for Subcontract Services**

1. THE AGREEMENT: This Master Agreement for Subcontract Services (hereinafter "Agreement") is made by and between **KERAMIDA Inc.** (hereinafter "KERAMIDA") and _____ (hereinafter "Subcontractor"). The Subcontractor agrees that this Agreement shall constitute and is the complete agreement between the parties hereto, and supersedes all prior agreements between them, whether written or oral, and may be amended only by a written instrument modifying this contract and executed by both parties thereto.
2. HOLD HARMLESS: The Subcontractor shall be fully liable for the acts of its employees and agents whether or not it authorized performance of the acts giving rise to said liability. The Subcontractor agrees to indemnify and save KERAMIDA, its employees, officers, and directors harmless from all liability for damage to persons or property of contractors, laborers, suppliers, subcontractors, and all other persons, firms, or corporations, arising out of or because of the work covered by this Agreement or the special and general provisions and amendments hereto, including, but not limited to any liability for Federal or State withholding taxes, FICA or FUTA taxes or unemployment compensation taxes, together with any and all attorneys' fees and costs incurred by KERAMIDA on account thereof regardless of whether or not it is caused in part by the negligence of a party indemnified hereunder. This indemnification obligation shall not be limited by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Subcontractor under Workers' Compensation Acts, disability benefit acts, or other employee benefit acts.
3. SCOPE OF SERVICES:

As described in subcontract work orders.
4. INSURANCE:
 - a. General Requirements:
 - (i) KERAMIDA shall be named AS ADDITIONAL INSURED on all policies except Workers Compensation.
 - (ii) All policies shall be endorsed to waive rights of subrogation against KERAMIDA.
 - (iii) The Subcontractor or his agent shall obtain and furnish a Certificate of insurance binding upon the insurance carrier indicated describing all policies and coverage including the stipulation that no substantial change will be made in any coverage without 30 days written notice to KERAMIDA.
 - b. Policy Specifics:
 - (i) Complete Policy Number Must be Shown: Binder Numbers not Acceptable.

- (ii) Complete Name of the Insurance Carrier (s).
- (iii) Exact Limits of Liability indicating Occurrence and Aggregate.
- (iv) Indication if the policies are "Occurrence" or "Claims Made" Form.
- (v) Indication of policy coverage and expiration dates.
- (vi) KERAMIDA Inc. shall be Certificate holder.

Coverages:

Minimum Limits	
Workers Compensation	Statutory
Employers Liability	\$500,000
Comprehensive General Liability	\$1,000,000 per occurrence \$2,000,000 aggregate

- A. Must include Contractual Liability,
- B. Must include coverage for Explosion, Collapse, Underground and Pollution
- C. Self Insured Deductibles if any \$ _____ (amount).

Comprehensive Automobile Liability	\$1,000,000 CSL
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- A. Must include Hired & Non-Owned Vehicles
- B. Must Indicate if licensed Hazardous Waste Hauler

Pollution Liability	\$2,000,000 CSL
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- A. Must indicate if Policy is in Occurrence or Claims Made Form

5. INDEPENDENT CONTRACTOR: The Subcontractor is an independent contractor, and the detailed manner and method of performing the work are under the sole control of the Subcontractor. This Agreement is not one of employment or agency by KERAMIDA and Subcontractor and the acts of subcontractor or its employees or agents shall not create any KERAMIDA liability whatsoever.
6. DRUG FREE WORKPLACE: The Subcontractor will provide and maintain a drug free workplace and work force in accordance with all applicable federal, state, and local drug and alcohol related laws and regulations (e.g., DOT regulations, Department of Defense (DOD) Drug-Free Workforce Policy, Drug-Free Workplace Act of 1988). The Subcontractor will immediately notify KERAMIDA of any violation of said policy.
7. CANCELLATION: KERAMIDA may cancel this order at any time and pay the agreed-upon price for the proportionate part of the material, labor and equipment previously

delivered or performed, but KERAMIDA shall not be liable for any claims for anticipated profits or for incidental or consequential damages.

8. LIENS: The Subcontractor will pay and satisfy all claims for labor and material employed or used in or with the work hereunder and agrees to indemnify and save KERAMIDA harmless from all liens of any kind, and the Subcontractor will furnish KERAMIDA, at KERAMIDA's request, proof that there are no unsatisfied liens, debts or encumbrances. In the event a lien should attach, KERAMIDA, without prejudice to its rights under this paragraph, shall have the right to take all steps necessary to remove such lien, including payment of the underlying debt.
9. DATA RIGHTS: All drawings, surveys and data recorded by the Subcontractor pursuant to the performance of this contract shall be the exclusive property of KERAMIDA and no additional copies shall be made for anyone without KERAMIDA's written approval. All such material shall be delivered to KERAMIDA upon completion of this Subcontract, or whenever sooner demanded by KERAMIDA. All drawings, surveys, data and information gathered by the Subcontractor shall be treated as confidential business information and shall not be disclosed to any other party without the expressed written consent of KERAMIDA.
10. PAYMENTS: KERAMIDA shall pay the Subcontractor for each approved invoice within seven (7) days after KERAMIDA receives payment therefore from the Client or other person obligated to make payment to KERAMIDA. Such payment shall be an absolute condition to Subcontractor's right to receive payment on its invoices.
11. TIME: Time is of the essence, and Subcontractor shall diligently pursue the performance of the work undertaken and complete this order within the time limits specified. If, in KERAMIDA's exclusive opinion, Subcontractor is not diligently proceeding, KERAMIDA shall have the immediate right to complete the work itself, or have another subcontractor complete the work, and KERAMIDA shall have such right without prejudice to any other rights it may have against Subcontractor.
12. WORK RULES: The Subcontractor shall clear away all tools, machinery, debris, rubbish and any and all other materials and things which may be lying on or about the site of the work, and shall do everything necessary to finish the work in a complete and workmanlike manner, both in appearance and in fact, and to notify KERAMIDA within three (3) days in writing of any accident.
13. LAWS: The Subcontractor will comply with all applicable Federal, State and local laws and regulations, and shall secure and pay for all permits, fees and licenses necessary for the proper execution and completion of the performance of this contract.
14. ASSIGNMENT: The Subcontractor agrees not to assign this contract or any amounts due or to become due without the written consent of KERAMIDA, nor to subcontract the whole or any portion of this contract without the prior written consent of KERAMIDA.
15. WARRANTS AND GUARANTEES: Subcontractor guarantees and warrants the work performed hereunder, to be in accordance with generally accepted professional and construction practices, and all materials and supplies furnished by Subcontractor to be free from any and all defects. Subcontractor further warrants not to infringe on the patent rights

of any person or persons or corporations in the performance of the work undertaken hereunder, and further agrees to defend and save KERAMIDA harmless from any and all damages, costs and expenses by reason of claims or suits for infringement, resulting from or alleged to result from the work.

16. APPLICABLE LAW: This Subcontract Agreement shall be governed in all respects by the laws of the State of Indiana.
17. SUCCESSORS AND ASSIGNS: Each of the parties hereto binds itself, its partners, successors, assigns and legal representatives to the other party and its partners, successors, assigns and legal representatives.
18. CONTRACT TERM: This Agreement shall be effective for a minimum period of one year. It shall commence on the date signed by the Subcontractor and shall remain in effect for all projects conducted for KERAMIDA for a minimum of one year and will continue to govern projects conducted for KERAMIDA subsequent to the expiration of the one year minimum term until the parties terminate said Agreement upon sixty (60) days written notice delivered to the other party by certified mail return receipt requested.

<p>KERAMIDA INC.</p> <p>By: _____</p> <p>Name: _____</p> <p>Title: _____</p> <p>Date: _____</p> <p><u>KERAMIDA Contact Information:</u></p> <p>Contact: _____</p> <p>Address: 401 N College Ave. _____</p> <p>City: Indianapolis _____</p> <p>State: IN _____ Zip: 46202 _____</p> <p>Phone: 317-685-6600 _____</p> <p>FAX: 317-685-6610 _____</p> <p>Email: _____</p>	<p>SUBCONTRACTOR'S</p> <p>NAME: _____</p> <p>SUBCONTRACTOR'S Authorized</p> <p>Signature of Acceptance: _____</p> <p>By: _____</p> <p>Name: _____</p> <p>Title: _____</p> <p>Date: _____</p> <p><u>Subcontractor Contact Information:</u></p> <p>Contact: _____</p> <p>Address: _____</p> <p>City: _____</p> <p>State: _____ Zip: _____</p> <p>Phone: _____</p> <p>FAX: _____</p> <p>Email: _____</p>
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ATTACHMENT 4

**STANDARD OPERATING PROCEDURES
FOR
NOTE TAKING AND LOG BOOK ENTRIES**

Prepared by:

**KERAMIDA ENVIRONMENTAL, INC.
401 North College Avenue
Indianapolis, Indiana 46202
317/685-6600**

Revised: December 11, 2006

MATERIALS

Permanently-bound log book (no spiral-bound log books)

Black ballpoint pen with waterproof ink

Pencil

PROCEDURES

1. Use black ballpoint pen with waterproof ink (felt-tip pens should not be used). If extreme weather conditions do not allow for the use of ballpoint pen, use pencil but note the reason.
2. Reserve the inside front cover of the log book for business cards from key personnel who conduct work at the site, including the staff in charge of the log book.
3. On the first page of the log book, place a return for reward notice, KERAMIDA's phone number, and the project manager's name.
4. Enter the following information on the second page of the log book: project name, project number, project manager's name, on-site contacts, on-site telephone number and address, telephone numbers for all key personnel, and emergency fire and medical telephone numbers.
5. Number each page, initial each page, and put the date at the top of each page. Start a new page for each day of field activity. At the end of a day, summarize the day's activities, sign the page, and put a slash through the rest of the blank lines. Start recording next day field activities on a new page.
6. Enter the time in military time (e.g., 0830) in the left column of each page when an entry is recorded in the field notebook.
7. If a mistake is made in an entry, cross out the mistake with one line and initial the end of the line.
8. At all times, maintain a chain-of-custody report for the field log book.

CONTENT

1. Be sure that log book entries are LEGIBLE and contain accurate and inclusive documentation of project field activities.
2. Provide sufficient detail to enable others to reconstruct the activities observed.

3. Thoroughly describe all field activities while on-Site. Be objective, factual and thorough. *Language should be free of personal feelings or other terminology that might be considered subjective or inappropriate.*
4. Describe problems, delays, any unusual occurrences (such as wrong equipment or breakdowns) along with the resolutions and recommendations that resulted.
5. Fully document any deviations from or changes to the workplan.
6. Describe the weather and changes in the weather, particularly during sampling events.
7. Sketch a map of the facility or area on-site where activities are occurring, especially the location of sampling points.
8. During sampling activities, record all information pertaining to the sampling event. Include descriptive locations and diagrams of the sampling locations, time, sampling media, planned laboratory analyses, sampling procedure, equipment used, sizes and types of containers, preservation used and any resulting reactions, sampling ID (especially for duplicate samples), shipping procedures (record airbill numbers), and addresses.
9. Note documentation or disposal procedures for all equipment, samples and protective clothing and how effectively each is performed.
10. If possible, photograph all sampling locations and areas of interest. Maintain a photographic log in the field log book with this information:

Date, time, photographer, name of site, general compass direction the photographer is facing, description of the subject taken, and sequential number of the photograph and the roll number.
11. Record the names and affiliations of key personnel on-site each day.
12. List all field equipment used and record field measurements, including distances, monitoring and testing instrument readings (e.g., photoionization detector (PID), organic vapor analyzer (OVA), pH, conductivity, model numbers) and calibration activities.
13. Record proposed work schedules and changes in current schedules in the log book.
14. Describe site security measures.

**STANDARD OPERATING PROCEDURE
FOR
CALIBRATION OF PHOTOVAC MICRO FID
PORTABLE FLAME IONIZATION DETECTOR**

Prepared by:

**KERAMIDA, INC.
401 North College Avenue
Indianapolis, Indiana 46202
317/685-6600**

Revised: June 25, 2008

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REFERENCES

Hanna Instruments HI 9828 Multiparameter Instruction Manual, March 2006

CALIBRATION OF THE PHOTOVAC MICROFID PORTABLE FLAME IONIZATION DETECTOR

GENERAL INFORMATION

The Photovac Micro FID will be calibrated before the start of each day of field work. Additionally, calibration checks are to be conducted after each break and prior to continuing work. At a minimum three calibration checks per day are to be conducted (mid-morning, lunch, and mid-afternoon).

The concentration of methane span gas will be 100 ppm. The acceptance range for calibration will be within five percent of this value. If the acceptance range cannot be achieved after attempting to re-calibrate the instrument two times, refer to the troubleshooting guidance in the owner's manual. If, after reviewing the troubleshooting guidance, the calibration remains out of the acceptance range calibrate the backup instrument. If a second instrument was not available for use at the site contact the office to request a replacement instrument. Soil sampling cannot proceed until a calibrated instrument is present at the site.

MicroFID must be calibrated in order to display concentration in ppm units equivalent to the calibration gas. First a supply of zero air is used to set MicroFID's zero point. Then calibration gas, containing a known concentration of an ionizable gas or vapor is used to set the sensitivity. Typically clean ambient air will be suitable as zero air. A charcoal filter included in the Calibration Kit may be connected to the instrument to produce clean air from otherwise unsuitable ambient air.

Methane in hydrocarbon free air is used as span gas.

CALIBRATING MICROFID

To calibrate MicroFID:

1. Connect the regulator supplied with the calibration kit to the calibration gas cylinder.
2. Tighten the regulator onto the tank with a wrench. Do not over-tighten.
3. Press CAL and select a Cal Memory point for the sampling event. Each Cal Memory stores a different response factor, zero point, sensitivity, and alarm level
4. When prompted to enter a response factor enter 1.00 and press ENTER.
5. Select Low Range or High Range and press ENTER. Use Low Range if you are sampling concentrations between 0.5 and 2000 ppm (methane equivalents). Use High Range if you are sampling concentrations between 10 and 50,000 ppm (methane equivalents)

6. You will be prompted to connect the supply of zero air. Press ENTER so ambient air will be used for this purpose. MicroFID will now set its zero point
7. MicroFID then asks for the span gas concentration. Enter the known span gas concentration and then connect the calibration gas cylinder to the inlet. Open the valve.

Note: Ensure the instrument is level during calibration. If the Micro FID is tilted to either side the flame height will be affected and cause erroneous readings.

8. Press ENTER and MicroFID sets its sensitivity.
9. When MicroFID's display reverts to normal, it is calibrated and ready for use. Remove the span gas bag from the inlet.
10. Press the ALARM key and enter the alarm level for the selected Cal Memory.

If a fault is encountered during normal operation, press the Tutor key to display a description of the fault. Press exit to return to the normal display.

The Tutor Key will also explain the functions of the various instrument keys. To start a tutorial session:

1. Turn on FID and select “no Flame” option
2. Press “Tutor” key
3. Press various keys and read the display
4. Press “Exit” to end the tutorial session

Trouble Shooting: Refer to the owners manual for assistance.

**STANDARD OPERATING PROCEDURE
FOR
FIELD SCREENING OF SOIL SAMPLES**

PREPARED BY:

**KERAMIDA ENVIRONMENTAL, INC.
401 North College Avenue
Indianapolis, Indiana 46202
317/685-6600**

Revised: December 11, 2006

MATERIALS

Latex or nitrile gloves
Plastic sheeting
Plastic bags
Photoionization detector (PID) and/or Flame Ionization Detector (FID)
Munsel Chart

PROCEDURES

1. Place a clean piece of plastic sheeting over the work area.
2. Classify soil samples using the U.S. Department of Agriculture and KERAMIDA Soil Description Systems. Classify the soil samples for lithology, moisture content, odor, staining, color (identify with Munsel Chart) and any other significant characteristic.
3. Once the sample is classified, split the sample into two equal portions (longitudinally if it is a soil core): one for field screening and the other for laboratory screening. Place one portion of the sample into a new, clean and labeled plastic bag for field screening and seal the bag; place the other portion of the sample into a new, clean and labeled sample container obtained from the laboratory and seal the container.
4. Immediately place the laboratory container sample on ice in a cooler. Allow the field screening sample to sit for 10 to 15 minutes to allow organic vapors to equilibrate in the air space of the bag. All field screening samples must be treated identically to ensure accurate comparisons. For example, if one field screening sample is placed in the sun to warm then all samples are placed in the sun.
5. Field screen the volatilized sample using an appropriate, calibrated photoionization detector (PID) or a flame-ionization detector (FID) depending on the suspected contaminants. FID instruments are more sensitive to the presence of heavier organic compounds such as polynuclear aromatic hydrocarbons. Ensure the selected instrument is properly calibrated in accordance with the methods presented in its respective operations manual. At a minimum, the instrument should be “bump checked” once per day. The samples are field screened by inserting the PID or FID probe into the plastic bag, while the bag remains closed. Record the maximum reading on the boring log and/or in the field log book.
6. At the completion of the field screening process, determine which, if any, of the sample intervals will be sent to the laboratory for analysis. All samples that are *not* sent to the laboratory will be disposed of in accordance with the site-specific Sampling and Analysis Plan (SAP) or Quality Assurance Project Plan (QAPP).
7. Keep detailed notes in the field logbook per KERAMIDA’s Field SOP for Note Taking and Log Book Entries.

**STANDARD OPERATING PROCEDURE
FOR
PUSH-PROBE SOIL SAMPLING**

Prepared by:

**KERAMIDA ENVIRONMENTAL, INC.
401 North College Avenue
Indianapolis, Indiana 46202
317/685-6600**

Revised: April 5, 2007

MATERIALS

Field Log Book
Latex or nitrile gloves
Munsel chart
Plastic bags
Plastic sheeting
Photoionization detector (PID) or flame ionization detector (FID)
Push-Probe Drill Rig
Disposable plastic liners for push-probe sample tube
Appropriate Personal Protective Equipment (PPE)
Sample containers and Terra Core sample kits for VOCs
Sample labels and indelible marker
Cooler with ice

PROCEDURES

1. Place a clean piece of plastic sheeting over the work area.
2. Place clean nitrile or latex vinyl examination gloves on hands.
3. Obtain discrete soil samples from the borings using either a 2-inch diameter/5-foot long, 2-inch diameter/4-foot long, or a 1.5-inch diameter/2-foot long stainless steel sampler equipped with dedicated, disposable plastic liners.
4. Once the sampler is opened, classify the soils using the U.S. Department of Agriculture and KERAMIDA Soil Description systems. Classify the soil samples for lithology, moisture content, odor, staining, color (identify with Munsel Chart), and any other significant characteristic.
5. Collect samples from each two-foot interval unless otherwise specified in the site-specific Sampling and Analysis Plan (SAP) or Quality Assurance Project Plan (QAPP).
6. Once the sample is classified, split the sample longitudinally into two equal portions: one for field screening and the other for laboratory analysis. If the sample will be submitted for laboratory analysis for VOCs, BTEX, or TPH-GRO, collect it using a Terra Core or Encore sample kit. Seal the container, label it, and immediately place on ice in a cooler. Place the remainder of the soil into a new, clean, and labeled plastic bag. Seal the bag.
7. Allow the bag to sit for 10 to 15 minutes to allow organic vapors to equilibrate in the air space of the bag. All field screening samples must be treated identically to ensure accurate comparisons. For example, if one field screening sample is placed in the sun to warm then all samples are placed in the sun.

8. Field screen the volatilized sample using an appropriate, calibrated photoionization detector (PID) or a flame-ionization detector (FID) depending on the suspected contaminants. FID instruments are more sensitive to the presence of heavier organic compounds such as polynuclear aromatic hydrocarbons. Ensure the selected instrument is properly calibrated in accordance with the methods presented in its respective operations manual. At a minimum, the instrument should be “bump checked” once per day. The samples are field screened by inserting the PID or FID probe into the plastic bag, while the bag remains closed. Record the maximum reading on the boring log and/or in the field log book.
9. At the completion of the field screening process, determine which of the sample intervals will be sent to the laboratory for analysis. All samples that are *not* sent to the laboratory will be disposed of in accordance with the site-specific SAP or QAPP.
10. Complete the chain-of-custody form with the appropriate sampling information.
11. If samples collected using Terra Core or Encore sample kits cannot be analyzed at the laboratory within 48-hours of collection, freeze the samples for transport to the laboratory. Additionally, request the laboratory freeze the samples upon receipt.
12. Keep detailed notes in the field logbook per KERAMIDA’s Field SOP for Note Taking and Log Book Entries.

**STANDARD OPERATING PROCEDURES
FOR
SOIL SAMPLING USING HAND TROWEL**

Prepared by:

**KERAMIDA ENVIRONMENTAL, INC.
401 North College Avenue
Indianapolis, Indiana 46202
317/685-6600**

Revised: December 11, 2006

MATERIALS

Field Log Book
Hand trowels (stainless steel)
Munsel chart
Nitrile or latex gloves
Photoionization detector (PID) or flame ionization detector (FID)
Plastic bags
Plastic sheeting
Appropriate Personal Protective Equipment (PPE)
Sample kit (cooler, containers, and ice)
Sample labels and indelible marker
Shovel

PROCEDURES

1. Wear clean nitrile or latex gloves and other personal protective equipment as appropriate.
2. Decontaminate the sampling trowel per KERAMIDA's Field Decontamination of Sampling Equipment SOP.
3. Remove all surface vegetation (if applicable) with the trowel or another decontaminated tool (e.g., shovel).
4. Place the blade tip of trowel into soil and push firmly until the desired depth is reached. If sampling a loose gravelly or sandy soil, carefully remove the trowel so that the blade approaches a position to prevent soil from falling off the blade. If sampling a stiff silty or clayey soil, it will probably be necessary to remove the trowel and reinsert it to further loosen the soil.
5. Shallow subsurface soil samples can be collected by digging a hole or trench (i.e., using a trowel, shovel or backhoe), then removing the loose soil and collecting a soil sample at the desired depth. If a trowel is used to dig the initial hole, properly decontaminate the trowel before collecting the soil sample or use a separate decontaminated trowel for sample collection.
6. Examine contents of the samples and remove rock, cobble, and organic debris, such as roots, grass, and woody material, with clean nitrile or latex gloves.
7. If the sample will likely be submitted for laboratory analysis of volatile organic compounds (VOCs), transfer a portion of the soil directly into a new, clean and labeled sample container obtained from the laboratory. Seal the container and immediately place the laboratory container sample on ice in a cooler.

8. Split the remainder of the sample into two equal portions: one for field screening and the other for laboratory screening. Place both sample aliquots into separate, new, clean and labeled plastic bags. Immediately place the laboratory screening aliquot on ice in a cooler.
9. Allow the field screening aliquot to sit for 10 to 15 minutes to allow organic vapors to equilibrate in the air space of the bag. All field screening samples must be treated identically to ensure accurate comparisons. For example, if one field screening sample is placed in the sun to warm then all samples are placed in the sun.
10. Field screen the volatilized sample using an appropriate, calibrated photoionization detector (PID) or a flame-ionization detector (FID) depending on the suspected contaminants. FID instruments are more sensitive to the presence of heavier organic compounds such as polynuclear aromatic hydrocarbons. Ensure the selected instrument is properly calibrated in accordance with the methods presented in its respective operations manual. At a minimum, the instrument should be “bump checked” once per day. The samples are field screened by inserting the PID or FID probe into the plastic bag, while the bag remains closed. Record the maximum reading on the boring log and/or in the field log book.
11. At the completion of the field screening process, determine which, if any, of the samples will be sent to the laboratory for analysis. All samples that are *not* sent to the laboratory will be disposed of in accordance with the site-specific Sampling and Analysis Plan (SAP) or Quality Assurance Project Plan (QAPP).
12. Before filling other sample containers, separate clumps of dirt and mix the contents of the bag to a homogeneous particle size and soil texture.
13. Transfer the bag contents to the appropriate laboratory provided glass sample containers using clean nitrile or latex gloves.
14. The sample containers should be sealed, labeled, and placed on ice in a cooler maintaining a temperature of 4°C., in anticipation of laboratory analysis.
15. Keep detailed notes in the field logbook per KERAMIDA’s Field SOP for Note Taking and Log Book Entries.

**STANDARD OPERATING PROCEDURE
FOR
FIELD DECONTAMINATION OF SAMPLING EQUIPMENT**

Prepared by:

**KERAMIDA ENVIRONMENTAL, INC.
401 North College Avenue
Indianapolis, Indiana 46202
317/685-6600**

Revised: December 11, 2006

MATERIALS

Tap water
Deionized or distilled water
Scrub brushes (short- and long-handled)
Buckets or trash cans
Nonphosphate detergent (Liquinox or Alquinox)
Pesticide-grade solvent (isopropanol, acetone, or hexane in spray bottle)
Polyethylene plastic sheeting, plastic garbage bags, and Ziploc® plastic bags
Paper towels or Kimwipes®
Nalgene squirt bottles
Wire brush
Duct tape
Appropriate Personal protective equipment (e.g., nitrile gloves, eye protection, skin protection)

Note: All sampling equipment must be decontaminated before shipment to the office.

FIELD DECONTAMINATION

1. Field sampling equipment should be decontaminated prior to and after each use to minimize the potential for cross-contamination.
2. Place polyethylene sheeting on a firm, flat surface (if available) to collect spillage during decontamination (when required). Mix a solution of phosphate-free, biodegradable detergent (i.e., Alconox®) and distilled water in a bucket. A phosphate-free, biodegradable detergent and tap water solution can be used for push-probe sampling equipment.
3. Don the appropriate personal protective equipment as determined by the Site-specific Health and Safety Plan (HASP) to prevent exposure to skin, eyes, and respiratory system.
4. Wipe contaminated sampling equipment with paper towels to remove residual soils or gross contamination. If necessary, heavy oils or grease may be removed with paper towels soaked with solvent (acetone or methanol).
5. Disassemble sampling equipment (e.g., push-probe samplers, bailers). Wash equipment thoroughly with phosphate-free, biodegradable detergent and distilled water (use tap water for push-probe equipment) solution. Teflon bailers must be disassembled and the inside washed with a long-handled bottle brush or a short-handled brush pulled through the bailer with a rope.
6. Double rinse the equipment with distilled water (use tap water for push-probe equipment).

7. Note any discrepancies from standard decontamination procedures in the logbook per KERAMIDA's Field SOP for Note Taking and Log Book Entries.

DISPOSAL OF DECONTAMINATION SOLUTIONS

Field decontamination presents unique problems for the disposal of decontamination solutions. Nonphosphate wash water must be containerized and properly disposed of in the facility wastewater treatment system, or otherwise in accordance with state and federal laws. The generation of solvent rinsewaters should be minimal in field decontamination. Solvents should be collected in separate buckets and allowed to evaporate.

Paper towels soaked with cleaning solvent should be allowed to air dry and then disposed with solid waste. Under no circumstances should any decontamination solution be disposed by pouring it on the ground surface.

ATTACHMENT 5



SITE-SPECIFIC HEALTH & SAFETY PLAN

For

**Wabash River Bank
Remedial Action**

**Former Western Tar Facility – Terre Haute, Indiana
Project No. 13490
August 2009
Revised November 2009**

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- 1 Agreement and Acknowledgement Sheet
 Site Safety Amendment Sheet
 Daily Safety Meeting Form
- 2 Material Safety Data Sheets (MSDS)
- 3 Preliminary Incident Report (PIR)
- 4 Excavation / Trenching Safety Procedures
 Excavations and Trenching with Underground Utilities
- 5 Heavy Equipment Operation
 Heavy Equipment Operator Standard
- 6 Working at Elevated Heights

INTRODUCTION

Site-Specific Requirements

KERAMIDA Inc. (KERAMIDA) has developed this document to address the hazards and identify the safeguards to be implemented for site personnel engaged in the Wabash River Bank Remedial Action contaminant removal activities at the Former Western Tar Facility (CAVU Ops., Inc.) located at 2525 Prairieton Road, Terre Haute, Indiana 47802 (Site). This site specific Health and Safety Plan (HASP) provides procedures and guidelines that will minimize the potential for physical harm or exposure to respiratory hazards of onsite personnel, visitors, and general public during construction activities.

Information required under this HASP must include site specific training on supervising personnel (introduction to safety officer, project manager, foreman, and so forth); disclosure of known hazards on site (physical, chemical, biological, confined spaces, heat stress, and so forth); protective measures (monitoring equipment, protective clothing, access controls, decontamination procedure); emergency procedures (evacuation routes, location and use of emergency equipment, emergency phone numbers, etc.).

This HASP has been written to ensure the safety of onsite personnel and the community surrounding the work site. Accordingly, all KERAMIDA project staff and approved KERAMIDA subcontractors must follow the policies and procedures established in this Plan. This HASP contains site-specific information, hazard analysis, and project information. Based on the project activities and tasks conducted at this site, site personnel assigned to this project must read all sections and then sign the Acknowledgement Sheet in Appendix 1 to confirm that they understand and agree to abide by the provisions of this HASP.

The Occupational Safety and Health Act (OSHA) standards, and other state, and local procedures will be used for this project. Completion of the activities covered by this document certifies that the workplace has been evaluated for the hazards described. A hazard assessment has been performed and the adequacy of the personal protective equipment (PPE) selected is compliant with 29 CFR 1910.132 and is duly noted by the signatures and date appearing on the cover pages of this document.

Approval Sheet

Health and Safety Plan

This HASP is designed to establish responsibilities, personal protection guidelines, air monitoring protocol, and emergency procedures that may be necessary during coal tar contaminant removal processes.

CLIENT	Former Western Tar (CAVU Ops., Inc.)
CLIENT CONTACT	Joe Card, President & Owner of CAVU Ops., Inc.
TELEPHONE#	(812) 298-1835
FACILITY ADDRESS	2525 Prairieton Road, Terre Haute, Indiana
PROJECT MANAGER	Brian Harrington
HEALTH & SAFETY COORDINATOR	Larry Newport, C.S.P.
PROJECT NUMBER	13490
PROJECT OBJECTIVES	Phase I: Crane operation, hauling, loading and removal of surficial coal tar impacts from the Wabash River Bank via crane; and Phase II: removal of the overburden and underlying layer of impacted material (approximately 4-feet in thickness)
PROPOSED DATE(S) OF WORK	August 10, 2009 through September 30, 2009
REVIEW AND APPROVALS	
PROJECT MANAGER	(Signature)
HEALTH & SAFETY COORDINATOR	(Signature)
DATE	August 10, 2009

Key Personnel and Responsibilities

KERAMIDA Project Manager:	Brian Harrington
KERAMIDA H&S Coordinator:	Larry Newport
KERAMIDA Field Staff:	Brian Harrington, Larry Newport, Jason Condry, Jason Juliano, Seth Robinson, Jennifer Davis, Brian Winter

KERAMIDA Project Manager

The KERAMIDA Project Manager (PM) is ultimately accountable for all Health and Safety issues on the project. The PM's primary function is to oversee the management activities onsite to ensure that the scope of services required per the Contract and scope of work are carried out to the satisfaction of all proper parties. The PM is responsible for amending the HASP if any unexpected or unforeseen hazards not addressed by this HASP are found using the Site Safety Amendment Sheet located in Appendix 1. The PM will be fully acquainted with the required Health and Safety aspects of the project.

KERAMIDA Health and Safety Coordinator

The KERAMIDA Health and Safety (H&S) Coordinator is responsible for ensuring that the HASP and the specific onsite health and safety requirements, based on known or anticipated concerns are addressed and adhered to. If necessary, the H&S Coordinator can modify the site-specific HASP to accommodate on-Site changes that may affect safety. Any and all changes will be approved by the PM. The H&S Coordinator will be present at the Site during field activities to verify that the HASP is being followed by all field staff and subcontractors.

Field Staff and Subcontractors

All field staff and subcontractors are responsible for understanding and complying with all of the requirements of the HASP and the site-specific health and safety requirements. Prior to performing any work, all field staff and subcontractors must review and sign the Agreement and Acknowledgement Form located in Appendix 1. Daily safety meetings shall be conducted by the KERAMIDA onsite safety officer when two or more employees are onsite together and when subcontractors are working onsite. Daily safety meetings discuss the HASP and any task-specific health and safety concerns that may be encountered that day. Each worker will acknowledge their participation in the daily safety meeting by signing the Daily Safety Meeting Form located in Appendix 1.

Site Background Information

The work will be completed on the Former Western Tar Facility consisting of a stretch of approximately 400 feet of bank along the Wabash River. The first phase involves removal of surficial coal tar impacts along the 400-foot reach of the Wabash, while the second phase involves excavation and removal of over burden and the underlying impacts, which measure approximately 4-feet in thickness and will extend eastward from the start of excavation until impacts are no longer visually observed or to a distance of 25 feet from the start of excavation, whichever is less.

This HASP will only be applicable to activities associated with hauling, loading and removal of surficial coal tar impacts along the river bank, which will include operation of a long-reach excavator set atop the bank of the Wabash River, as well as excavation of coal tar impacts and impacted soil on the Former Western Tar property. KERAMIDA will not be accountable for maintaining health and safety compliance for other non-associated work functions that may occur on the property or for other contractors at the Site.

Compounds of potential concern (COPC) that are known to exist or potentially exist at the Site include: Benzene, Napthalene, and Cresols. Material Safety Data Sheets (MSDS's) for each compound listed can be found in Appendix 2.

PPE requirements for this project will be Level D protection. These include but are not limited to:

- ANSI hard hat
- ANSI safety glasses or goggles
- ANSI steel toed boots
- Ear plugs
- Leather or puncture resistant gloves

Site Activities

Implementation of the Remedial Action at the Former Western Tar facility consists of the following components:

- Site Preparation,
- Removal of surficial impacts from the bank of the Wabash River,
- Excavation of overburden and underlying impacts on the CAVU Ops property, and
- Sample collection for confirmation of successful removal of contaminated soil.

Site Preparation

Site preparation will consist of those activities performed to ready the Site for Remedial Action. This includes installation of silt fence along the riverbank (See Figure 1) to protect against any

material inadvertently rolling into the river. In addition, an excavator will be used to lower a skid steerer to the river bank to assist laborers with shovels to clean up the surficial impacts.

Surficial Impact Removal

Removal of surficial impacts along the bank of the Wabash River will be accomplished by workers using shovels to dig out and load the contaminated material into the excavator's bucket, which will then be placed directly in a truck located atop the river bank and hauled to the appropriate disposal facility.

Overburden and Underlying Impact Excavation

Utilizing a field spotter on the riverbank, the excavator will begin removing the overburden (soil and vegetation) directly above the approximate four foot thickness of the impacted material. After the over burden is removed and placed in a location for potential re-use, the excavator will begin to remove the impacted material and direct load it into the same trucks mentioned above. The excavator will remove impacts until they are no longer visually impacted or a distance of 25 feet east of the start of the removal, whichever is less. If visual impacts are still present at the 25 foot distance, then a physical barrier will be emplaced next to the remaining visibly impacted thickness. Backfill will then be placed in the area in a manner to prohibit any potential migration of the material. In this event, further evaluation will take place concerning this material following the end of the project. Additionally any backfill necessary to ensure slope stability at the twenty foot elevation and above will be installed. All excavated material will be hauled offsite to the appropriate disposal facility.

Sample Collection

Confirmation soil samples will be collected in areas along the bank that formerly contained more than 6 square feet of visually impacted material. It is expected that approximately 5 samples will be collected and analyzed for VOCs and SVOCs that contain the COPCs, benzene, naphthalene, and cresols.

Emergency Phone Numbers

In the event of any emergency, contact project manager or health and safety representative.

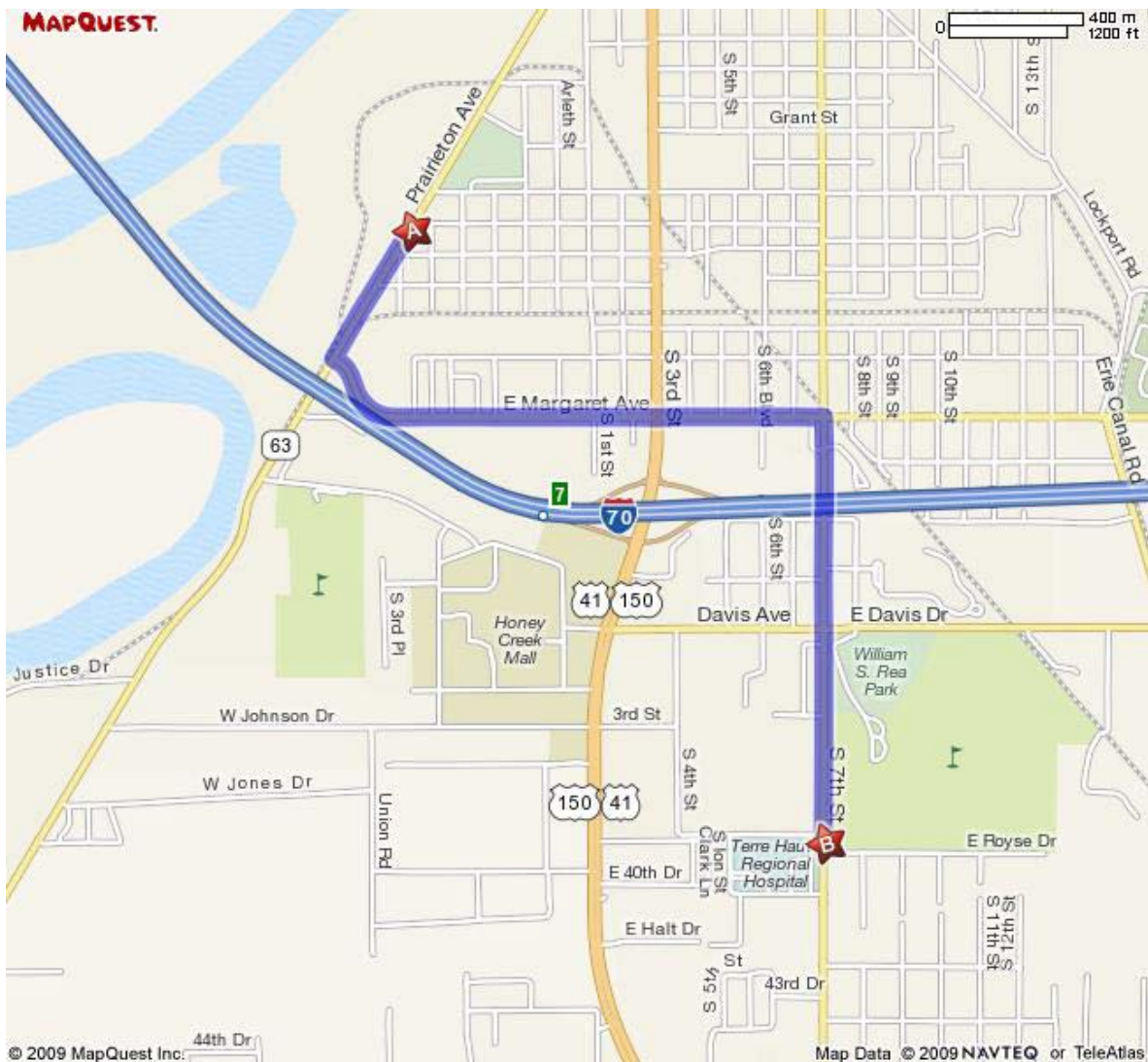
Ambulance	911
Fire	911 or (812) 232-5352
Police	911 or (812) 238-1661
Poison Control	(317) 962-2323
Hospital Name	Union Hospital
Hospital Phone Number	(812) 238-7523

State Agency	IOSHA (317) 232-2693
KERAMIDA Project Manager	Brian Harrington (317) 685-6616 (506-8801 mobile)
KERAMIDA H&S Coordinator	Larry Newport (317) 631-9586 ((812) 239-9312 mobile)
Client Contact: CAVU Ops., Inc.	Mr. Joe Card (812) 298-1835

Utility Marker Emergency Telephone Numbers

Utility	Color Code	Telephone Number
Water	Blue	American Indiana Water Company 1-800-492-8373
Gas	Yellow	Vectren Energy Delivery (812)464-4760
Electric	Red	Duke Energy 1-800-343-3525
Telephone	Orange	Various
Cable	Orange	Various
Sewer	Green	Wastewater Utility (812) 323-6564
Dig Safe Telephone Number:	(800) 382-5544	

Hospital Location Map



HOSPITAL DIRECTIONS:

A: Head Southwest on Prairieton Ave/IN-63 toward W. Preston Street (0.3mi)
 1: Turn Left onto W. Margaret Ave (1.1mi)
 2: Turn Right onto 7th St. (1.0mi)
 B: End at 3901 S. 7th Street (Hospital Entrance)

Source: MapQuest 2009

HOSPITAL INFORMATION:

Name: Regional Hospital
Address: 3901 S. 7th Street
City, State: Terre Haute, Indiana
Phone: Emergency: 911
General: (812) 237-1475

Location of Safety Equipment

Include a list and the locations of ALL safety equipment that is available for immediate use.

First aid kit	KERAMIDA vehicle / Subcontractors to Supply own
Fire Extinguisher	KERAMIDA vehicle / Subcontractors to Supply own
Eye wash	Construction Trailer / KERAMIDA vehicle / Subcontractors to Supply own
Safety shower	Non-applicable
Spill kit	Subcontractors to Supply own
Fire blanket	Non-applicable
MSDS station	Appendix 2
Evacuation rally area or shelter	Tangent Rail Office

Hazard Analysis

For each task involved in this project, the types of hazards that may be encountered are identified in the table below. For available instruction on the safe work procedures to follow, refer to the appropriate section listed in the appendices.

Indicate what hazard types are known to be present at the job site

	<u>HAZARDS</u>
X	Slips, trips, falls
X	Chemical exposure
	Biological hazard
	Radiological hazard
	Hazardous atmosphere
X	Dust, silica, fumes, vapors, gases
	Confined spaces
X	Trench or excavation
X	Excessive heights / ladders
	Electricity
	Utilities
X	Lifting/ cranes/ slings/ booms
X	Heavy equipment
X	Fire / explosion hazards
	Lockout / tag out
	Vehicular traffic
X	Pedestrian traffic

	<u>HAZARDS</u>
X	Noise / vibration
X	Illumination
X	Back injury
	Pressurized vessels
X	Drilling, welding, cutting
X	Temperature stress
X	Drums
	Other

Based on the site specific hazard analysis, the following programs will be implemented and require completion of forms and/or review of information found in the appendices.

Site Specific Program	Appendix
Incident Reporting	3
Excavation and Trenching	4
Heavy Equipment Operation	5
Working at Elevated Heights	6

STANDARDIZED INFORMATION

This plan contains standardized information to address health and safety issues associated proposed work activities. The minimum level of Personal Protective Equipment (PPE) for work on site is Level D. Appropriate PPE will be worn when the possibility of contact to the skin or work uniform can occur from contaminated soil media. If an upgrade to Level C PPE needs to occur when the results of air monitoring reveals that the action levels have been exceeded, all work will stop and the HIS Project Manager and Superintendents and the KERAMIDA Project Manager and Health & Safety Coordinator will be notified.

This HASP must be modified or amended when circumstances or conditions develop that are beyond the scope of routine operations. Any changes in project work scope and / or Site conditions as described must be amended in writing by the KERAMIDA Project Manager and Health & Safety Coordinator. Such conditions include:

- Discovery of uncharacterized hazardous materials
- Upgrading to Level C or higher
- Operations that have never been attempted
- Operations for which personnel have not been trained

Hazardous Chemical Contaminants

Following are tables of known or potential hazardous chemical contaminants that could be encountered at the Site:

Chemical	Exposure Route	Symptoms of Exposure	Incompatibilities
VOCs	Inhalation	Dizziness, headache, loss of coordination	Strong oxidizers, heat
	Ingestion	Nausea	
	Skin Contact	Dermatitis	
PNAs	Inhalation	Cough, dizziness, headache, weakness	Heat, flame, strong oxidizers
	Ingestion	Nausea, vomiting	
	Skin Contact	Redness, burns, pain	

Emergency First Aid Information

Ingestion:	DO NOT INDUCE VOMITING; Call Poison Control; follow instructions. Administer CPR if necessary. Seek medical attention.
Inhalation:	Remove person from contaminated environment. DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND STANDBY PERSON IS PRESENT. Administer CPR if necessary. Seek medical attention.
Skin Contact:	Brush off dry material, remove wet or contaminated clothing. Flush skin thoroughly with water. Seek medical attention if irritation persists.
Eye Contact:	Flush eyes with water for 15 minutes. Seek medical attention.
Exposure Symptoms:	Headache, dizziness, nausea, drowsiness, irritation of eyes, nose, throat, breathing difficulties.
Contingency Plan:	Report incident to KERAMIDA Project Manager and Health & Safety Coordinator after emergency procedures have been implemented.

RESPONDER MUST HAVE A CURRENT CERTIFICATE TO ADMINISTER FIRST AID OR CPR

1. Survey the situation. Do not endanger yourself. DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND STANDBY PERSON IS PRESENT.
2. Call 911 or the fire department IMMEDIATELY. Explain the nature of the injury, chemical exposure, fire, or release.
3. Decontaminate the victim without delaying life- saving procedures.
4. If victim is non-critical but in a serious condition, transport the victim to the nearest hospital by Emergency Medical services.
5. Notify the KERAMIDA Project Manager and Health & Safety Coordinator. Complete the Preliminary Incident Report within 24 hours.

Emergency Procedures

If there is any doubt regarding the degree of hazard of a particular circumstance and personnel are unsure as to what measures to take or what protective equipment to utilize, the following steps should be taken to ensure the health and safety of those involved. Written reports for any and all incidents shall be documented on the Preliminary Incident Report (PIR) form.

Unexpected Emergency

- 1) **Stop Work Immediately**
Personnel should remove themselves from the hazard or suspected hazard area.
- 2) **Activate the Emergency Response System (911) / First Aid**
Personnel should activate local police, fire, HAZMAT, or medical emergency response system if necessary. Apply first aid to any injured employees and accompany the injured to the nearest hospital.
- 3) **Secure the Work Site**
Personnel should make certain Site is stable and secured against further harmful events.
- 4) **Contact KERAMIDA Project Manager and Health & Safety Coordinator.**
Be prepared to give all details of the situation and actions that were taken.

Employee Injury

In the event that someone is injured in the field due to physical or chemical hazards, the following course of action should be taken:

- 1) Initiate first-aid procedures using universal precaution techniques and arrange for prompt medical attention for the employee. If possible, move or evacuate all personnel from the area of immediate hazard.

If the injury involves potential chemical overexposure, immediately contact the City of Terre Haute Fire Department and the ER Department at Regional Hospital via **911**.

They will give instructions as to specific procedures, which may need to be followed. Also, remember to inform all emergency personnel that there is potential chemical contamination involved. If possible, initiate decontamination procedures to prevent contamination of responding personnel.
- 2) Promptly notify KERAMIDA Project Manager and Health & Safety Coordinator.
- 3) If exposure or potential exposure to blood or other potential infectious materials exists through the application of first aid/CPR, follow the use of universal precautions in treating all blood/body fluid as infectious, utilizing proper PPE and personal hygiene practices.

Fire and/or Explosion (no injury)

If a fire or explosion occurs on site, the following steps should be taken:

- 1) If fire or smoke of any magnitude is detected, all employees shall alert other employees of the situation, call 911 for emergency help, and evacuate the area immediately to the evacuation rally point.
- 2) If the fire is beyond control or there is a potential for explosion, all personnel should immediately evacuate the site.
- 3) Emergency fire department personnel should be contacted immediately. If the fire involves hazardous materials, the emergency responders must be informed of the location, quantity, and type of such hazardous materials. Copies of hazardous chemicals' Material Safety Data Sheets shall be provided to emergency responders whenever possible.
- 4) Promptly notify KERAMIDA Project Manager and Health & Safety Coordinator.

Chemical Release Evacuation Plan

In the event that there is an accidental spill, release, discharge, and so forth of toxic or hazardous liquid, gas, vapor, dust, or mist, the following actions will be taken:

- 1) Personnel in the immediate area of the incident should quickly assess the degree of danger.
- 2) If possible and without danger to the employee, the source of the release should be stopped (such as, right the tipped bottle, shut the open valve, absorb with spill containing materials, and so forth).
- 3) If possible and without danger to the employee, immediately eliminate all flames, burners, or other possible sources of ignition.
- 4) Under no circumstance shall any employee attempt to contain an uncontrollable hazardous chemical release under the actions of this plan.
- 5) Promptly notify KERAMIDA Project Manager and Health & Safety Coordinator.

Heat Stress Procedures

Heat stress is a significant potential hazard associated with work task performed and the degree of protective equipment used in hot weather environments. Local weather conditions may produce situations that will require restricted work schedules in order to protect employees. Monitoring for heat stress will follow one or two protocols depending on whether impermeable clothing (tyvek, saranex) or permeable clothing (cotton) is worn. Impermeable clothing impedes cooling by sweat evaporation and puts workers at higher risk. Rest periods should be in shade and be sufficient enough to allow workers to recover from the effects of heat stress.

Prevention of Heat Stress

- Provide plenty of fluids to drink. Water is best. Avoid soda or caffeine.
- Work in pairs (Use the buddy system).
- Provide cooling devices such as ice vests, showers, fans, or air conditioning.
- Adjust work schedule to carry out intensive tasks during the coolest part of the day.
- Utilize shaded areas whenever possible.

Recognition and Treatment of Heat Stress

Any personnel who observe any form of heat stress either in themselves or in another worker must report the information to his supervisor or safety officer immediately. An excessive heat stress condition may exist when sustained (more than 5 minutes) oral or ear temperature is greater than 99.5 °F and/ or sustained pulse rate (more than 5 minutes) is above 90 beats per minute.

Conditions of heat stress are as follows from least to greatest:

Heat Rash or Prickly Heat

Cause: Continuous exposure to hot, humid air, aggravated by chafing clothing.

Symptoms: Formation of red pimples around sweat ducts accompanied by intense itching.

Treatment: Remove source of irritation and cool skin with water.

Heat Cramps or Heat Prostration

Cause: Profuse perspiration and inadequate replenishment of water and electrolytes.

Symptoms: Development of pain, cramps, muscle spasms in abdomen.

Treatment: Remove worker from heat exposure, remove restrictive clothing, decrease body temperature, replenish fluids, and rest in cool location.

Heat Exhaustion - SERIOUS

Cause: Overexertion in hot environment and profuse perspiration accompanied by inadequate replenishment of water and electrolytes.

Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing.

Treatment: Perform the following while simultaneously making arrangements for transport to medical facility: Remove worker from heat exposure, remove restrictive clothing. Lie worker

down in cool place with the feet in an elevated position. Administer fluids. Keep victim conscious and alert. Transport to hospital.

Heat Stroke – EXTREMELY SERIOUS

Cause: Same as heat exhaustion.

Symptoms: No perspiration, skin is hot and dry, dry mouth, dizziness, nausea.

Treatment: Perform the following while simultaneously making arrangements for transport to medical facility: Remove worker from heat exposure, remove restrictive clothing. Lie worker down in cool place and raise the head and shoulder slightly. Cool the body without chilling. Apply wet cloth to head. Sponge bare skin with cool water. Transport to hospital.

HAZARD IDENTIFICATION AND CONTROL

Precautions must be taken to prevent injuries and exposures to the following hazards.

Potential Hazards and Controls

Potential Hazard	Control
Chemical exposure (See an MSDS for more specific information on chemical exposure) MSDS can be found in the appendices of this plan	<ol style="list-style-type: none"> 1. Stay upwind whenever possible. 2. Minimize contact and contact time with chemical. 3. Avoid walking through suspected areas or anything likely to be contaminated. 4. Do not eat, drink, smoke, or apply cosmetics in contaminated zones. 5. Wear gloves when in contact with contamination. 6. Wear safety glasses at all times. 7. Splash goggles must be worn when working with liquids. 8. Exposure greater than %50 PEL vapors in breathing zone, sustained for 5 minutes requires upgrade to Level C. 9. Exposure equal to the PEL vapors in breathing zone, sustained for 5 minutes requires upgrade to Level B. 10. Unknown materials, call the KERAMIDA PM and H&S Coordinator. 11. All hazardous materials must be adequately labeled and have MSDS available. 12. Use Daily Safety Meeting to record training attendance.
Container management (drums & cylinders)	<ol style="list-style-type: none"> 1. All containers must be clearly labeled for contents 2. Incompatible materials must be separated by 20 ft or physical barrier 3. Avoid storage in high traffic areas 4. Containers must not be damaged, dented, or leaking 5. Containers must be kept securely closed when not in use 6. All cylinders must be securely anchored upright
Vehicular Traffic	<ol style="list-style-type: none"> 1. Wear traffic safety vest. 2. Use cones, flags, barricades, and caution tape to define work area. 3. Use vehicle to block work area. 4. Engage police detail for high traffic situations.

Potential Hazard	Control
Utility Lines	<ol style="list-style-type: none"> 1. Contact Dig Safe to have utility lines marked prior to excavation, trenching, drilling, or boring. 2. Refer to site drawings or client if on private property for utility locations. 3. Hand dig when within 5 feet of a utility marker.
Inclement weather	<ol style="list-style-type: none"> 1. Cease all outdoor work during electrical storms, hail, other extreme weather conditions. 2. Take cover indoors. 3. Listen to local forecasts for weather watches and warnings.
Noise	<ol style="list-style-type: none"> 1. Wear hearing protection when working near drill rig, jackhammer, cutting saw, compressor, blower, or other heavy equipment. 2. Wear hearing protection when it is necessary to raise your voice above normal speech levels due to loud noise.
Electric Shock	<ol style="list-style-type: none"> 1. Maintain appropriate distance from overhead utilities: 10 Feet minimum clearance from power lines 50 kV or less 10 Feet minimum plus 4 inches for every 10 kV over 50 kV 2. Use ground fault interrupters. 3. Use adequate grounding of electrical systems 4. Check equipment for frayed wiring or exposed circuits 5. Perform lockout / tag out procedures. 6. Use three pronged plugs and extension cords. 7. Contact your local utility locating service. 8. Follow code requirements for electrical installations in hazardous locations.
Physical Injury	<ol style="list-style-type: none"> 1. Wear hard hats and safety glasses when on site. 2. Maintain visual contact with equipment operator and wear safety colored vest when heavy equipment is used on site. 3. Avoid loose fitting clothing. 4. Prevent slips, trips, and falls by keeping work area uncluttered. 5. Keep hands away from moving parts. 6. Test emergency cut off switch on equipment every day.
Back injury	<ol style="list-style-type: none"> 1. Use a mechanical lifting device. 2. Plan the lift. 3. Check your route. 4. Bend at the knees. 5. Use the buddy system. 6. Do not twist your body when lifting.
Load Drop During Crane Operation	<ol style="list-style-type: none"> 1. Hard Hats/Safety Shoes required. 2. Operator will operate with a ground guide. 3. Rigging will be performed with a Trained Rigger 4. Drums will be lifted using drum carrier approved for lifting 55 gallon drums. 5. Crane will be operated in accordance with OSHA Regulations.

Potential Hazard	Control
Heat Stress	<ol style="list-style-type: none"> 1. Increase water intake. 2. Take frequent breaks, or rotate workers, take shorter work shifts. 3. Watch for signs and symptoms of heat exhaustion and fatigue. 4. Avoid the hottest part of the day. Plan work for early morning or evening. 5. Use ice vests when necessary. 6. Rest in cool areas. 7. In the event of heat stroke, cool the victim and initiate first aid. Seek immediate medical attention.
Bites, stings from spiders, insects, snakes	<ol style="list-style-type: none"> 1. Avoid suspected areas such as tall grass, brush, or undergrowth. 2. Use caution moving or lifting objects which could be used as cover. 3. Never reach under or behind objects which could be used as cover. 4. Wear long pants and sleeves. 5. Wear heavy gloves and sturdy leather boots. 6. Use repellent. 7. Check for signs of bites such as redness, swelling, and flu-like symptoms. 8. Snake and spider bites can be medical emergencies – seek treatment immediately.
Fire Control	<ol style="list-style-type: none"> 1. Smoke only in designated areas. 2. Keep flammable liquids in approved containers. 3. Keep approved containers closed. 4. Keep work areas free from combustible debris. 5. Isolate ignition sources.
Static Electricity	<ol style="list-style-type: none"> 1. Do not create static discharge around flammable materials. 2. Electrically bond and ground pumps, vessels, tanks, drums, and probes when moving flammable liquids. 3. Do not splash fill containers filled with flammable liquids.
Rapid response	<ol style="list-style-type: none"> 1. Ensure emergency response activities have been completed prior to beginning rapid response activities. 2. Conduct hazard assessment of project site and communicate findings through a daily safety meeting (tailgate meeting) to employees and subcontractors prior to beginning rapid response activities. 3. Communicate health and safety programs to other contractors on site that may be impacted and coordinate field activities with them.
Welding, cutting, brazing	<ol style="list-style-type: none"> 1. Conduct fire safety evaluation (hot work permit). 2. Ensure flammable materials are protected from hot work and sources of ignition. 3. Ensure fire watch / fire extinguisher is on standby.
Cleaning equipment	<ol style="list-style-type: none"> 1. Wear appropriate PPE to avoid skin and eye contact with cleaning materials. 2. Stand upwind to minimize any potential inhalation exposure. 3. Dispose of spent cleaning solutions and rinses accordingly.

Personal Protective Equipment (PPE)

Only PPE that meets the following American National Standards Institute (ANSI) standard are to be worn.

Eye Protection ANSI Z87.1-1989

Head Protection ANSI Z89.1-1986

Foot Protection ANSI Z41-1991

Specific PPE requirements are as follows:

LEVEL D	Steel toed safety boots
	Safety glasses or splash goggles
	Hard hat
	Latex or Nitrile Gloves, as necessary
	Standard work uniform or coveralls
	Coveralls (Modified Level D)(Tyvek or equivalent), if necessary
	Work gloves, as necessary

Site Control

Work zones will be established in order to delineate traffic locations, identify hazardous locations, and contain contamination within the smallest area possible. Employees entering the work zone must wear the proper PPE for that area. Work and support areas will be established based on ambient air data, necessary security measures, and site specific conditions.

Working in Street or Roadway
Wear traffic vest and hardhat when vehicle hazard exists Use cones, flags, caution tape, or barricades Use vehicle strobe light and block area with truck Develop traffic patterns for high density areas Use flagger Use flashing arrows Use "Men Working" signs Obtain lane closing permits Engage police details
Working at Excavation or Trenching Sites
Safeguard open excavations by restricting unauthorized access. Highlight work area using warning signs (cones, barricades) placed a minimum of 10 feet from excavation opening. Maintain zone definitions along perimeter with continuous string of yellow caution tape.

Decontamination Procedures

Operations conducted on site have the potential to contaminate field equipment and PPE. To prevent transfer of contamination to vehicles, offices, and personnel, the procedures below must be followed:

Item	Examples	Procedure
Field equipment	hand tools, etc.	Decontaminate with a solution of detergent and water, rinse prior to leaving the site. Protect from exposure by covering with disposable covers such as plastic to minimize required decontamination.
Disposable PPE	Tyvek suits, gloves, etc.	Dispose of according to the requirements of the client, state, and federal agencies.
Non-Disposable PPE	Boots	Decontaminate outside with a solution of detergent and water, rinse with water prior to leaving the site. Protect from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.

Contingency Plans and Field Communications

The table below presents contingency plans for potential emergency situations.

Situation	Action
Evacuation	<ul style="list-style-type: none"> ▪ Immediately notify all on site personnel of an emergency requiring evacuation. ▪ Leave dangerous area and report to a pre-designated rally point. ▪ Notify EMS if appropriate. ▪ Account for all personnel. ▪ Contact KERAMIDA PM and H&S Coordinator as soon as possible. ▪ Maintain site security and control measures for community safety until emergency responders arrive.
Medical Emergency	<p>Survey the situation</p> <p>Do not enter an area that may jeopardize your safety</p> <ul style="list-style-type: none"> • Establish the victims level of consciousness. • Call for help. • Contact EMS and inform them of victims condition. • Primary assessment (patient unconscious). • Arousal. • Airway. • Breathing. • Circulation. <p>Only trained personnel should perform CPR or First Aid</p> <p>Secondary Assessment (patient conscious)</p> <ul style="list-style-type: none"> • Check for bleeding (control with direct pressure). • Do not move patient (unless location is not secure). • Monitor vital signs. • Provide First Aid to the level of your training. • Contact KERAMIDA PM and H&S Coordinator as soon as possible.
Fire Emergency	<p>Evacuate the area.</p> <p>Notify EMS.</p> <p>Extinguish small fires with an all purpose dry chemical extinguisher.</p> <p>Contact KERAMIDA PM and H&S Coordinator as soon as possible.</p>

Situation	Action
Spill or Release	<p>Properly document the location of underground lines before starting work. If a line or tank is broken, document the spill or release in writing. Include dates, times, actions taken, agreements reached, and the names of the people involved. In the event of a release follow this plan:</p> <ul style="list-style-type: none"> • Wear appropriate PPE, stay upwind of the release. • Turn off equipment and other sources of ignition. • Turn off pumps and shut valves to stop flow. • Plug the leak or collect spill if possible. • Call Fire Department if fire emergency develops. • Inform project manager about situation. • Determine if client wants to repair damage or if the client will use an emergency repair contractor. • Contact spill contractor for containment of free product. • Advise client of spill discharge notification requirements and determine who will complete and submit forms. Document each interaction with the client and regulators. Note in writing: name, title authorizations, refusals, decisions, and commitments to actions. • Do not transport or approve to transport contaminated soils or product until proper manifests have been completed and approved. • Do not sign manifests as generators of wastes.
<p>A spill or release requires completion of the preliminary incident report. The KERAMIDA PM and H&S Coordinator must contact the client or generator. The generator is under obligation to report to the proper government agencies. If the spill extends into water ways, the Coast Guard and the National Response Center (800 424-8802) must be notified immediately by the client or with his permission.</p>	

Field Communications

Communications at the work site can be verbal and/or non-verbal means to ensure contact with employees and subcontractors. Verbal communication can be impacted by background noise and while wearing respiratory protection. The table below lists the type of communication methods and equipment to use depending on site conditions. Communication equipment must be checked daily to ensure proper orientation and all project personnel must be briefed on the communication methods prior to starting work and reviewed at daily safety meetings as a reminder.

Device	Communication	Signal
On site phone or cellular phone	Emergency notification	Initiate phone call using applicable emergency numbers (911)
Two way radio	Emergency notification among site personnel	Initiate radio communication with "CODE RED" message
Compressed air horn	Hailing site personnel for non-emergency	One long blast, one short blast
Compressed air horn	Hailing site personnel for emergency evacuation	Three continuous blasts
Visual	Hailing site personnel for distress, needs help	Arms waived in circle overhead
Visual	Hailing site personnel for emergency evacuation	Arms waved in criss-cross over head
Visual	Contaminated air/ strong odor / difficulty breathing	Hand clutching throat
Visual	Break, lunch, end of day	Two hands together, break apart
Visual	Positive response	Thumbs up
Visual	Negative response	Thumbs down
Visual	Communication failed	Hand to ear

APPENDIX 1

**AGREEMENT AND ACKNOWLEDGEMENT SHEET
SITE SAFETY AMENDMENT SHEET
DAILY SAFETY MEETING FORM**

AGREEMENT AND ACKNOWLEDGEMENT SHEET

KERAMIDA personnel have the authority to stop field activities at this site if any activity is not performed in accordance with the requirements of this plan. All personnel, subcontractor personnel, and visitors are required to sign the Agreement and Acknowledgement Sheet prior to conducting field activities at this Site.

AGREEMENT AND ACKNOWLEDGEMENT STATEMENT

1. I have reviewed and fully understand of this plan and my responsibilities.
2. I am aware that additional, standardized health and safety information is available for me.
3. I agree to abide by the provisions of this health and safety plan.

Name _____ Signature _____

Company	Date
---------	------

Name _____ Signature _____

Company	Date
---------	------

Name _____ Signature _____

Company	Date
---------	------

Name _____ Signature _____

Company	Date
---------	------

Name _____ Signature _____

Company	Date
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Name _____ Signature _____

Company	Date
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Name _____ Signature _____

Company	Date
---------	------

Name _____ Signature _____

Company	Date
---------	------

Name _____ Signature _____

Company	Date
---------	------

SITE SAFETY AMENDMENT SHEET

Project Name: Former Western Tar

Project Number: 13490

KERAMIDA PM: Brian Harrington

KERAMIDA H&S
Coordinator: Larry Newport, C.S.P.

Location: 2525 Prairieton Road, Terre Haute, Indiana 47802

Changes in field activities/ scope of work/ hazards:

Approved by: _____

Date: _____

DAILY SAFETY MEETING FORM

Project Name:	Wabash River Bank Remedial Action	Date:	
Project Number:	3268B	Completed By:	

SITE ADDRESS: 2525 Prairieton Road
Terre Haute, Indiana

Check the Topics/Information Reviewed:

	SAFETY GLASSES, HARD HAT, SAFETY BOOTS
	SITE SAFETY PLAN REVIEW AND LOCATION
	EQUIPMENT AND MACHINERY FAMILIARIZATION
	EMPLOYEE RIGHT-TO-KNOW/MSDS LOCATIONS
	OPEN PITS, EXCAVATIONS, AND SITE HAZARDS
	VEHICLE SAFETY AND DRIVING/ROAD CONDITIONS
	PORTABLE TOOL SAFETY AND AWARENESS
	OVERHEAD UTILITY LOCATIONS AND CLEARANCE
	FIRST AID, SAFETY AND PPE LOCATION
	SHARP OBJECT, REBAR AND SCRAP METAL HAZARDS
	SAFETY IS EVERYONE'S RESPONSIBILITY
	LATEX GLOVES INNER/NITRILE GLOVES OUTER
	EXCAVATION/TRENCHING INSPECTIONS/DOCUMENTATION
	FULL FACE RESPIRATORS WITH PROPER CARTRIDGES
	REVIEW ACTION LEVELS WITH ALL PERSONNEL ON-SITE

	SLIPS, TRIPS AND FALLS
	DIRECTIONS TO HOSPITAL
	ANTICIPATED VISITORS
	ELECTRICAL GROUND FAULT
	PUBLIC SAFETY AND FENCES
	EXCAVATOR SWING AND LOADING
	ORDERLY SITE AND HOUSEKEEPING
	SMOKING IN DESIGNATED AREAS
	LEATHER GLOVES FOR PROTECTION
	EFFECTS OF THE NIGHT BEFORE
	VIBRATION RELATED INJURIES
	FIRE EXTINGUISHER LOCATIONS
	EYE WASH STATION LOCATIONS
	DECONTAMINATION PROCEDURES

	DAILY WORK SCOPE
	EMERGENCY PROTOCOL
	PARKING AND LAYDOWN
	HOT WORKS PERMITS
	STRAINS AND SPRAINS
	NOISE HAZARDS
	NO HORSEPLAY
	HEAT AND COLD STRESS
	BACKING UP HAZARDS
	ACCIDENTS ARE COSTLY
	DUST AND VAPOR CONTROL
	REFUELING PROCEDURES
	CONFINED SPACE ENTRY
	FLYING DEBRIS HAZARDS

Attendee Comments/Follow-up Actions: _____

Brief Description of Daily Tasks: _____

Associated Hazards and Required PPE: _____

EMERGENCY CONTACTS & PHONE NUMBERS

CAVU Ops., Inc.:	Joe Card	(812) 238-1835
KERAMIDA PM:	Brian Harrington	(317) 679-3731
KERAMIDA H&S Coordinator:	Larry Newport	(812) 239-9312
Terre Haute Police Department:		911 or (812) 238-1661
Terre Haute Fire Department:		911 or (812) 232-5352
Union Hospital:		911 or (812) 238-7523

[illegible]

APPENDIX 2

MATERIAL SAFETY DATA SHEETS (MSDS)

APPENDIX 3

PRELIMINARY INCIDENT REPORT (PIR)

PRELIMINARY INCIDENT REPORT (PIR)

Person Completing Report _____ Office _____ Date _____ Incident Date _____

Incident Time: _____ Location _____ Incident Class _____
(see 2nd page)

Person Involved in Incident _____ Telephone _____

Driver Name (if motor vehicle accident) _____ Telephone _____

_____ Type of Incident		
_____ Personal Injury/Illness	_____ Near Miss Event	Other
_____ Chemical Exposure	_____ Unsafe Condition/Action	
_____ Equipment Damage	_____ Fire/Explosion	
_____ Theft	_____ Spill/Release	
_____ Property Damage	_____ Customer Incident	
_____ Permit/Code Compliance	_____ Newspaper/Radio/TV	

Personal Injury _____ Yes _____ No (If no, go to next section)

Person Injured: _____

Injury Type:

Person Affected:

_____ First Aid Only	_____ KERAMIDA Employee
_____ Hospitalization	_____ Subcontractor
_____ Medical Treatment	_____ Customer/Public/Other
_____ Possible Injury, Not Confirmed	

Nature of Injury, Illness or Exposure: _____

Describe nature of incident, how it occurred, who was involved, witnesses and possible causal factors:

_____ First Report of Injury Attached (medical provider) _____ Police Report Attached _____ Photos Attached

Describe immediate actions taken and persons notified:

Describe corrective measures taken and communication to others (attach written detailed plan as needed):

Line Manager (Responsible for Follow-up) _____ Office _____

APPENDIX 4

EXCAVATION / TRENCHING SAFETY PROCEDURES EXCAVATIONS AND TRENCHING WITH UNDERGROUND UTILITIES

Excavation / Trenching Safety Procedures

Excavation and Trenching evaluations must be conducted by a competent person familiar with regulations found in 29 CFR 1926.

- Conduct daily inspections of all open excavations prior to entry. Complete trench safety form
- Inspect excavations after any changes in conditions (weather, heavy equipment operations, etc.).
- Employees shall not work in excavations in which there is accumulated water
- Excavations shall not be permitted where such excavation might undermine the base or footing of any foundation, or retaining wall
- Excavations 4 feet or more in depth must have ladders or stairs spaced no more than 25 feet apart so that a person in a trench is always within 25 feet of egress.
- Excavations 4 feet or more in depth require air monitoring.
- Excavations 5 feet or more in depth must be sloped, benched, or shored.
- Spoils and heavy equipment must be stored a minimum of 2 feet from the edge of the excavation.
- Unattended excavations must be demarcated with signs, fences, barricades, or other appropriate warning system
- Sloping for excavations shall not be at angle less than one and one-half horizontal measure to one vertical measure (34 degrees). For example, a five foot deep excavation must be have a horizontal run of 7'6".
- Employees shall not work on the face of a benched or sloped excavation at levels above other employees unless employees at lower levels are adequately protected from falling, rolling, sliding material or equipment
- Sloping or benching for excavations greater than 20 feet deep shall require design by a registered professional engineer.

Excavations and Trenching with Underground Utilities

- Contact the local utility services and document permit number.
- Contact a company utility representative in questionable areas, elaborate trenching projects, tight or tricky areas, whenever drilling adjacent to a building or structure.
- Use a metal detector to aid in the identification of obstructions.
- Observe utility markers, vent pipes, catch basins, newly paved areas, etc.
- Machine excavate five feet from any underground utility, tank, or utility marker.
- Hand dig in utility five foot tolerance zone until the service is exposed.
- Use test pits to establish and quality control markers for sensitive utility locations.
- Any exposed underground utility in an excavation must be protected, supported, or removed to protect workers
- Comply with local and state codes and regulations.
- Use experience and trained equipment operators.
- Use appropriate subcontractors and applicable riders.
- Hand dig per customer mandate.

APPENDIX 5

HEAVY EQUIPMENT OPERATION HEAVY EQUIPMENT OPERATOR STANDARD

Heavy Equipment Operation

Working around heavy equipment may be a necessary work requirement for employees. Heavy equipment operation may present unusual hazards to employees such as reduced visibility, noise, falling or shifting loads, and pedestrian traffic. Careful operation of heavy equipment must be maintained at all times. Heavy equipment operation applies to drilling rigs, tractors with dozers, motor graders, front-end loaders, wheeled or tracked backhoe/loaders, rollers, brush cutters, excavators, chip spreaders, heavy trucks/trailers, etc. When required, the Commercial Drivers Licensing (CDL) program with endorsements may be utilized as the licensing authority for heavy trucks.

- Before moving equipment, first walk the route of travel, inspecting for depressions, slumps, gullies, ruts, and similar obstacles
- Discharge all passengers before moving on rough or hilly terrain
- Use caution when traveling on a hillside. The addition of raised armatures, booms, or drill rigs may raise the center of gravity on the vehicle and cause roll over.
- Never attempt to move equipment with armatures, booms, or drill rigs in the raised position.
- All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors.
- A safety tire rack, cage, or equivalent protection will be provided and used when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices in accordance with 29 CFR 1910.177.
- Heavy machinery, equipment, or parts thereof, which are suspended or held aloft by use of slings, hoists, or jacks will be substantially blocked or cribbed to prevent falling or shifting before employees are permitted to work under or between them.
- Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment, will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise.
- Parking brakes will be set on all parked equipment. Equipment parked on inclines will have the wheels chocked and the parking brake set.
- No mobile equipment will be left parked within 10 feet of a railroad track unless the track has been derailed and flagged.
- The use, care and charging of all batteries will conform to the requirements of Subpart K of 29 CFR 1926 Subpart O.
- All cab glass will be safety glass, or equivalent, that introduces no visible distortion affecting the safe operation of any machine covered by this program.
- Derail and/or bumper blocks will be provided on spur railroad tracks where a rolling car could contact other cars or enter a building, work or traffic area.

Heavy Equipment Operator Standard

- Only those persons having been successfully trained and evaluated by their supervisor will be permitted to operate heavy mobile equipment. Each operator is responsible for making a daily visual inspection of the equipment s/he operates. Defects are to be reported promptly to the Supervisor so that corrections may be made.
- Each equipment operator is responsible for the safe operation of the equipment according to the manufacturer's instructions and for keeping the equipment under control at all times. In addition, the operator will comply with all applicable laws and regulations governing the operation of the equipment.
- Each operator will examine his/her equipment before initial daily operation and thereafter as required. He/she will report any defects or conditions affecting the safe operation of the equipment to his/her supervisor. Unsafe equipment will not be operated under any circumstances.
- Each Subcontractors management will designate a qualified supervisor or other qualified individual as a tester/trainer at the facility for each type of listed equipment. Depending on the skill level of the staff, this may be more than one individual. If the appropriate skill level is not available, a tester/trainer from another facility may be used.
- Training will be conducted only by qualified supervisors or designated operator trainers. Only qualified, competent truck drivers, equipment operators or supervisors will be designated as operator trainers.

APPENDIX 6

WORKING AT ELEVATED HEIGHTS

WORKING AT ELEVATED HEIGHTS

Ladder Safety General Guidelines

- 1) Inspect the condition of the ladder prior to its use. Never use equipment that is damaged or suspect.
- 2) Employees working on ladders should wear slip-resistant footwear. Make sure that the ladder rungs are free of oil, grease, or other slippery substances.
- 3) **Never** use a metal ladder within 10 feet of high voltage electrical parts.
- 4) When climbing or descending a ladder, face the ladder and hold on with both hands. If the employee must carry tools, use a tool belt or bucket hoist.
- 5) Always set the base or footings of a ladder on firm and level ground or floors.
- 6) Whenever possible utilize a second employee to serve as a spotter to secure the base of the ladder and forewarn unsuspecting people about an overhead hazard.
- 7) Keep the area around the base of the ladder clear of unnecessary slip, trip, and fall hazards.
- 8) Avoid placing a ladder in walkways, driveways, or in front of doors. If this is unavoidable, barricades or signs should be positioned to forewarn unsuspecting people.
- 9) Only one person is permitted on a ladder at any time.

Step Ladders

- 1) Never climb past the second rung from the top of a stepladder.
- 2) Ensure that both spreader bars are functional and fully locked in place prior to use.
- 3) Do not lean out past the base of the ladder's support.

Straight/Extension Ladders

- 1) Always use the 4 to 1 rule when positioning a straight ladder. For every four feet of working length on the ladder, set the base approximately one foot out from the vertical plane.
- 2) The top of a ladder must extend at least 36 inches beyond the top of the landing access or platform.
- 3) Never climb past the third rung from the top of a straight ladder.
- 4) Ensure that the ladder is equipped with safety feet.
- 5) To avoid overreaching, the employee should not allow the trunk of his or her body to extend beyond the sides of the ladder.
- 6) When lowering or raising an extension ladder, the employee should keep all hands clear of the rungs and pinch points.
- 7) Always tie off the top of a straight ladder to a stationary structure.
- 8) Both rails at the top of the ladder must be supported.

Scissor Lift Safety

DO NOT OPERATE A MOBILE SCAFFOLD UNLESS YOU HAVE BEEN TRAINED TO RUN IT. PRACTICE THE CONTROLS PRIOR TO ACTUAL OPERATIONS

1. Ensure that the lift is on firm and level surface. Do not drive on soft or uneven terrain. Do not operate on grades, slopes, or ramps.
2. Inspect the work area thoroughly for all obstacles, debris, drop-offs, holes, slopes, or depressions.
3. Inspect the lift before each use. Test all functions before raising platform. Check fluid levels, tire pressure, hoses, and elevating assembly. **NEVER OPERATE A DAMAGED LIFT.**
4. Ensure all guard rails are properly secured and gates and openings are closed. Do not sit, stand, lean, or place loads on guard rails.
5. Personnel must maintain firm footing inside the lift at all times. Do not use ladders or other objects on the lift to gain greater height. **ALWAYS KEEP YOUR TWO FEET ON THE PLATFORM FLOOR.**
6. Hard hat, safety glasses, and safety shoes must always be worn when operating the lift.
7. If the lift has outriggers, do not raise the platform until outriggers are fully extended and stabilizers are down.
8. Do not exceed the rated capacity of the lift. Distribute the load evenly over the platform.
9. Do not operate the lift when wind velocity exceeds 25 MPH or in thunderstorm conditions.
- 10. DO NOT DRIVE WITH THE PLATFORM RAISED.**
11. Do not allow ropes or cords to become entangled in the elevating parts.
12. Do not use the work platform as a crane.

ATTACHMENT 6

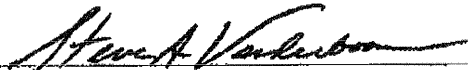


QUALITY ASSURANCE MANUAL

Quality Assurance/Quality Control Policies and Procedures Revision 12.0

Pace Analytical Services -- *Indianapolis*
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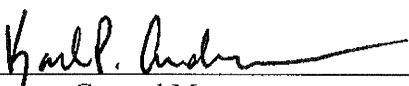
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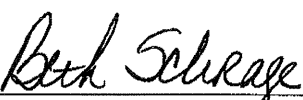


PACE ANALYTICAL SERVICES – INDIANAPOLIS
LOCAL APPROVAL

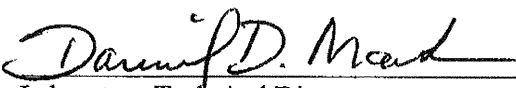
This document has been approved as the Quality Assurance Manual, effective 03-27-2009, as indicated by the following signatures:


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Date

Additional Signatures

Signature

Title

Date

Signature

Title

Date

Signature

Title

Date



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1.0 INTRODUCTION AND ORGANIZATIONAL STRUCTURE

“Working together to protect our environment and improve our health”

Pace Analytical Services Inc. - Mission Statement

1.1 Introduction to PASI

Pace Analytical Services, Inc. (PASI) is a privately held, full-service analytical testing firm operating a nationwide system of laboratories. PASI offers extensive services beyond standard analytical testing, including: bioassay for aquatic toxicity, air toxics, industrial hygiene testing, explosives, high resolution mass spectroscopy (including dioxins, furans and coplanar PCB's), radiochemical analyses, product testing, pharmaceutical testing, field services and mobile laboratory capabilities. PASI has implemented a consistent Quality System in each of its laboratories and service centers. In addition, the company utilizes an advanced data management system that is highly efficient and allows for flexible data reporting. Together, these systems ensure data reliability and superior on-time performance. This document defines the Quality System and QA/QC protocols.

Our goal is to combine our expertise in laboratory operations with customized solutions to meet the specific needs of our customers.

1.2 Statement of Purpose

To meet the business needs of our customers for high quality, cost-effective analytical measurements and services.

1.3 Quality Policy Statement and Goals of the Quality System

The PASI management is committed to maintaining the highest possible standard of service for our customers by following a documented quality system. The overall objective of this quality system is to provide reliable data through adherence to rigorous quality assurance policies and quality control procedures as documented in this Quality Assurance Manual.

All personnel within the PASI network are required to be familiar with all facets of the quality system and implement these policies and procedures in their daily work. This daily focus on quality is applied with initial project planning, continued through all field and laboratory activities, and is ultimately included in the final report generation.

PASI management demonstrates its commitment to quality by providing the resources, including facilities, equipment and personnel to ensure the adherence to these documented policies and procedures and to promote the continuous improvement of the quality system. All PASI personnel comply with all current applicable state, federal, and industry standards (such as the NELAP and ISO 17025 standards).

1.4 Pace Analytical Services Core Values

- **INTEGRITY**
- **VALUE EMPLOYEES**
- **KNOW OUR CUSTOMERS**
- **HONOR COMMITMENTS**
- **FLEXIBLE RESPONSE TO DEMAND**
- **PURSUE OPPORTUNITIES**
- **CONTINUOUSLY IMPROVE**

1.5 Code of Ethics

PASI's fundamental ethical principles are as follows:

- Each PASI employee is responsible for the propriety and consequences of his or her actions.
- Each PASI employee must conduct all aspects of Company business in an ethical and strictly legal manner, and must obey the laws of the United States and of all localities, states and nations where PASI does business or seeks to do business.
- Each PASI employee must reflect the highest standards of honesty, integrity and fairness on behalf of the Company with customers, suppliers, the public, and one another.

Strict adherence by each PASI employee to this Code of Ethics and to the Standards of Conduct is essential to the continued vitality of PASI.

Failure to comply with the Code of Ethics and Standards of Conduct will result in disciplinary action up to and including termination and referral for civil or criminal prosecution where appropriate. An employee will be notified of an infraction and given an opportunity to explain, as prescribed under current disciplinary procedures.

1.6 Standards of Conduct

1.6.1 Data Integrity

The accuracy and integrity of the analytical results produced at PASI are the cornerstones of the company. Lack of data integrity is an assault on our most basic values and puts PASI and its employees at grave financial and legal risk. Therefore, employees are to accurately prepare and maintain all technical records, scientific notebooks, calculations and databases. Employees are prohibited from making false entries or misrepresentations of data (e.g., dates, calculations, results or conclusions).

Managerial staff must make every effort to ensure that personnel are free from any undue pressures that may affect the quality or integrity of their work; including commercial, financial, over-scheduling and working condition pressures.

1.6.2 Confidentiality

PASI employees must not (directly or indirectly) use or disclose confidential or proprietary information except when in connection with their duties at PASI. This is effective over the course of employment and for a period of two years thereafter.

Confidential or proprietary information, belonging to either PASI and/or its customers, includes but is not limited to test results, trade secrets, research and development matters, procedures, methods, processes and standards, company-specific techniques and equipment, marketing and customer information, inventions, materials composition, etc.

1.6.3 Conflict of Interest

PASI employees must avoid situations that might involve a conflict of interest or appear questionable to others. The employee must be careful in two general areas:

- Participation in activities that conflict or appear to conflict with PASI responsibilities.

- Offering or accepting anything that might influence the recipient or cause another person to believe that the recipient may be influenced. This includes bribes, kickbacks or illegal payments.

Employees are not to engage in outside business or economic activity relating to a sale or purchase by the Company. Other questionable activities include service on the Board of Directors of a competing or supplier company, significant ownership in a competing or supplier company, employment for a competing or supplier company or participation in any outside business during the employee's work hours.

1.6.4 Compliance

All employees are required to read, understand and comply with the various components of the standards listed in this document. As confirmation that they understand this responsibility, each employee is required to sign an acknowledgment form (either hardcopy or in electronic database) annually (or as revisions become finalized) that becomes part of the employee's permanent record. Employees will be held accountable for complying with the Quality Systems as summarized in the Quality Assurance Manual.

1.7 Laboratory Organization

The PASI Corporate Office centralizes company-wide accounting, business development, financial management, human resources development, information systems, marketing, quality, safety, and training activities. PASI's Director of Quality, Safety & Training is responsible for assisting the development, implementation and monitoring of quality programs for the company. See Attachment IIB for the Corporate Organizational structure.

Each laboratory within the system operates with local management, but all share common systems and receive support from the Corporate Office.

A Senior General Manager oversees all the functions of all the operations within their designated region. The Senior General Manager is responsible for overseeing the development of local General Managers within their designated region. The Senior General Manager oversees and authorizes personnel development including staffing, recruiting, training, workload scheduling, employee retention and motivation. The Senior General Manager is responsible for the preparation of budgets and staffing plans for all operations within their designated region and ensures compliance with all applicable state, federal and industry standards.

A General Manager (GM) supervises each regional laboratory. Some operations may have an Assistant General Manager (AGM) in situations where the General Manager is responsible for multiple laboratory facilities and is not necessarily in the facility on a regular basis. Quality Managers (QM) at each lab report directly to their General Manager (or Assistant General Manager) but receive guidance and direction from the Director of Quality, Safety & Training.

The General Manager bears the responsibility for the laboratory operations and serves as the final, local authority in all matters. In the absence of the General Manager (and an Assistant General Manager), the Quality Manager serves as the next in command. He or she assumes the responsibilities of the GM until the GM is available to resume the duties of their position. In the absence of the GM and QM, management responsibility of the laboratory is passed to the Technical Director – provided such a position is identified – and then to the most senior department manager until the return of the GM or QM. The most senior department manager in charge may include the Client Services Manager or the Administrative Business Manager at the discretion of the General Manager.

A Technical Director who is absent for a period of time exceeding 15 consecutive calendar days shall designate another full-time staff member meeting the qualifications of the technical director to temporarily

perform this function. The laboratory General Manager or Quality Manager has the authority to make this designation in the event the existing Technical Director is unable to do so. If this absence exceeds 65 consecutive calendar days, the primary accrediting authority shall be notified in writing.

The Quality Manager has the responsibility and authority to ensure the Quality System is implemented and followed at all times. In circumstances where a laboratory is not meeting the established level of quality or following the policies set for in this Quality Assurance Manual, the Quality Manager has the authority to halt laboratory operations should he or she deem such an action necessary. The QM will immediately communicate the halting of operations to the GM and keep him or her posted on the progress of corrective actions. In the event the GM and QM are not in agreement as to the need for the suspension, the Chief Operating Officer and Director of Quality, Safety and Training will be called in to mediate the situation.

Under the direction of the General Manager, the technical staff of the laboratory is generally organized into the following functional groups:

- Organic Sample Preparation
- Wet Chemistry Analysis
- Metals Analysis
- Volatiles Analysis
- Semi-volatiles Analysis
- Radiochemical Analysis
- Product Testing
- Equipment Maintenance
- Microbiology

Appropriate support groups are present in each laboratory. The actual organizational structure for PASI – Indianapolis is listed in Attachment IIA. In the event of a change in General Manager, Quality Manager or Technical Director(s), the laboratory will notify its accrediting authorities and revise the organizational chart in the Quality Assurance Manual (QAM) within 30 days. For changes in Department Managers or Supervisors or other laboratory personnel, no notifications will be sent to the laboratory's accrediting agencies; changes to the organizational chart will be updated during or prior to the annual review process. Changes or additions in these key personnel will also be noted by the additional signatures on the QAM Local Approval page. In any case, the QAM will remain in effect until the next scheduled revision.

1.8 Laboratory Job Descriptions

1.8.1 Senior General Manager

1. Oversees all functions of all the operations within their designated region.
2. Oversees the development of local General Managers within their designated region.
3. Oversees and authorizes personnel development including staffing, recruiting, training, workload scheduling, employee retention and motivation.
4. Oversees the preparation of budgets and staffing plans for all operations within their designated region.
5. Ensures compliance with all applicable state, federal and industry standards.
6. Monitors the Quality Systems of the laboratory and advises the Quality Manager accordingly.
7. Ensures compliance with all applicable state, federal and industry standards.
8. Ensures compliance with all applicable state, federal, and industry standards.

1.8.2 Assistant General Manager / Operations Manager

1. In the absence of the GM, performs all duties as listed above for the General Manager.
2. Oversees the daily production and quality activities of the department.
3. Manages department and works with staff to ensure department objectives are met.
4. Works with other departments to ensure capacity and customer expectations are accurately understood and met.
5. Works with General Manager to prepare appropriate budget and staffing plans for the department.
6. Responsible for prioritizing personnel and production activities within the department.
7. Performs formal and informal performance reviews of departmental staff.

1.8.3 Quality Manager

1. Oversees the laboratory Quality Systems while functioning independently from laboratory operations. Reports directly to the General Manager.
2. Monitors Quality Assurance policies and Quality Control procedures to ensure that the laboratory achieves established standards of quality.
3. Maintains records of quality control data and evaluates data quality.
4. Conducts periodic internal audits and coordinates external audits performed by regulatory agencies or customer representatives.
5. Reviews and maintains records of proficiency testing results.
6. Maintains the document control system
7. Assists in development and implementation of appropriate training programs.
8. Provides technical support to laboratory operations regarding methodology and project QA/QC requirements.
9. Maintains certifications from federal and state programs.
10. Ensures compliance with all applicable state, federal and industry standards.
11. Maintains the laboratory training records, including those in the Learning Management System (LMS).

1.8.4 Technical Director

1. Monitors the standards of performance in quality assurance and quality control data
2. Monitors the validity of analyses performed and data generated.
3. Reviews tenders, contracts and QAPPs to ensure the laboratory can meet the data quality objectives for any given project
4. Serves as the general manager of the laboratory in the absence of the GM, AGM and QM.
5. Provides technical guidance in the review, development and validation of new methodologies.

1.8.5 Administrative Business Manager

1. Responsible for financial and administrative management for the entire facility.
2. Provides input relative to tactical and strategic planning activities.
3. Organizes financial information so that the facility is run as a fiscally responsible business.
4. Works with staff to confirm that appropriate processes are put in place to track revenues and expenses.
5. Provide ongoing financial information to the General Manager and the management team so they can better manage their business.
6. Utilizes historical information and trends to accurately forecast future financial positions.
7. Works with management to ensure that key measurements (mileposts) are put in place to be utilized for trend analysis—this will include personnel and supply expenses, and key revenue and expense ratios.
8. Works with General Manager to develop accurate budget and track on an ongoing basis.

9. Works with entire management team to submit complete and justified capital budget requests and to balance requests across departments.
10. Works with project management team and administrative support staff to ensure timely and accurate invoicing.

1.8.6 Client Services Manager

1. Oversees all the day to day activities of the Client Services Department which includes Project Management and, possibly, Sample Control.
2. Responsible for staffing and all personnel management related issues for Client Services.
3. Serves as the primary senior consultant to customers on all project related issues such as set up, initiation, execution and closure.
4. Performs or is capable of performing all duties listed for that of Project Manager.

1.8.7 Project Manager

1. Coordinates daily activities including taking orders, reporting data and analytical results.
2. Serves as the primary technical and administrative liaison between customers and PASI.
3. Communicates with operations staff to update and set project priorities.
4. Provides results to customers in the requested format (verbal, hardcopy, electronic, etc.).
5. Works with customers, laboratory staff, and other appropriate PASI staff to develop project statements of work or resolve problems of data quality.
3. Responsible for solicitation of work requests, assisting with proposal preparation and project initiation with customers and maintain customer records.
4. Mediation of project schedules and scope of work through communication with internal resources and management.
5. Responsible for preparing routine and non-routine quotations, reports and technical papers.
6. Interfaces between customers and management personnel to achieve customer satisfaction.
7. Manages large-scale complex projects.
8. Supervises less experienced project managers and provide guidance on management of complex projects.
6. Arranges bottle orders and shipment of sample kits to customers.
7. Verifies login information relative to project requirements and field sample Chains-of-Custody.

1.8.8 Department Manager/Supervisor

1. Oversees the day-to-day production and quality activities of their assign department.
2. Ensures that quality assurance and quality control criteria of analytical methods and projects are satisfied.
3. Assesses data quality and takes corrective action when necessary.
4. Approves and releases technical and data management reports.
5. Ensures compliance with all applicable state, federal and industry standards.

1.8.9 Group Leader/Supervisor

1. Trains analysts in laboratory operations and analytical procedures.
2. Organizes and schedules analyses with consideration for sample holding times.
3. Implements data verification procedures by assigning data verification duties to appropriate personnel.
4. Evaluates instrument performance and supervises instrument calibration and preventive maintenance programs.
5. Reports non-compliance situations to laboratory management including the Quality Manager.

1.8.10 Laboratory Analyst

1. Performs detailed preparation and analysis of samples according to published methods and laboratory procedures.
2. Processes and evaluates raw data obtained from preparation and analysis steps.
3. Generates final results from raw data, performing primary review against method criteria.
4. Monitors quality control data associated with analysis and preparation. This includes examination of raw data such as chromatograms as well as an inspection of reduced data, calibration curves, and laboratory notebooks.
5. Reports data in LIMS, authorizing for release pending secondary approval.
6. Conducts routine and non-routine maintenance of equipment as required.
7. Performs or is capable of performing all duties associated with that of Laboratory Technician.

1.8.11 Laboratory Technician

1. Prepares standards and reagents according to published methods or in house procedures.
2. Performs preparation and analytical steps for basic laboratory methods.
3. Works under the direction of a Laboratory Analyst on complex methodologies.
4. Assists Laboratory Analysts on preparation, analytical or data reduction steps for complex methodologies.
5. Monitors quality control data as required or directed. This includes examination of raw data such as chromatograms as well as an inspection of reduced data, calibration curves, and laboratory notebooks.

1.8.12 Sample Management Personnel

1. Signs for incoming samples and verifies the data entered on the Chain-of-Custody forms.
2. Enters the sample information into the Laboratory Information Management System (LIMS) for tracking and reporting.
3. Stages samples according to EPA requirements.
4. Assists Project Managers and Coordinators in filling bottle orders and sample shipments.

1.8.13 Systems Administrator or Systems Manager

1. Assists with the creation and maintenance of electronic data deliverables (EDDs).
2. Coordinates the installation and use of all hardware, software and operating systems.
3. Performs troubleshooting on all aforementioned systems.
4. Trains new and existing users on systems and system upgrades.
5. Maintains all system security passwords.
6. Maintains the electronic backups of all computer systems.

1.8.14 Safety/Chemical Hygiene Officer

1. Maintains the laboratory Chemical Hygiene Plan.
2. Plans and implements safety policies and procedures.
3. Maintains safety records.
4. Organizes and/or performs safety training.
5. Performs safety inspections and provides corrective/preventative actions.
6. Assists personnel with safety issues (e.g. personal protective equipment).

1.8.15 Waste Coordinator

1. Evaluates waste streams and helps to select appropriate waste transportation and disposal companies.
2. Maintains complete records of waste disposal including waste manifests and state reports.
3. Assists in training personnel on waste-related issues such as waste handling and storage, waste container labeling, proper satellite accumulation, secondary containment, etc.
4. Conducts a weekly inspection of the waste storage areas of the lab.

1.8.16 Sample Courier

1. Pace analytical courier is responsible for picking up sample from the customers.
2. Courier delivers bottles orders to customers
3. Ensures that the signed chain of custody is given to the client when samples are picked up.

1.9 Training and Orientation

Each new employee receives a five part orientation: human resources, ethics and data integrity, safety, Quality Systems, and departmental.

The human resources orientation includes benefits, salary, and company policies. All records are stored with Human Resources.

The ethics and data integrity training covers the obligations of each employee to ensure the defensibility of laboratory data. Employees are provided with general policies related to ethics in the laboratory and specific examples of improper practices that are unacceptable in any PASI facility. The employee is trained to make the right decisions with regards to laboratory practices and where to go for answers in circumstances where they may be unclear as to the correct protocol.

The safety orientation includes an in-depth review of the PASI Chemical Hygiene Plan/Safety Plan, which are consistent with the requirements of OSHA's Hazard Communication Program (29 CFR 1910.1200) and other pertinent regulations.

The Quality Systems orientation provides the new employee with information through an introduction to the Quality Assurance Manual and SOPs, acceptable record keeping practices, and the individual's responsibility to data quality. Quality Systems training is reinforced with the new employee as specific topics are covered during the departmental or analytical method training. Quality Systems training will address policies and practices that ensure the quality and defensibility of the analytical data. These topics include but are not limited to traceability of measurements, method calibration, calibration verification, accuracy, precision and uncertainty of measurements, corrective actions, documentation and root cause analysis.

The new employee's Department Supervisor provides the employee with a basic understanding of the role of the laboratory within the structure of PASI and the basic elements of that individual's position.

Supervised training uses the following techniques:

- Hands-on training
- Training checklists
- Lectures and training sessions
- Method-specific training
- Conferences and seminars
- Short courses
- Specialized training by instrument manufacturers
- Proficiency testing programs.

Group Supervisors/Leaders are responsible for providing documentation of training and proficiency for each employee under their supervision. The employee's training file indicates what procedures an analyst or a technician is capable of performing, either independently or with supervision. The files also include documentation of continuing capability (see Section 3.4 for details on Demonstration of Capability requirements). Training documentation files for each person are maintained by the Quality Office either in hardcopy format or within the Learning Management System (LMS).

All procedures and training records are maintained and available for review during laboratory audits. These procedures are reviewed/updated periodically by lab management. Additional information can be found in SOP S-IN-Q-153 *Training Procedures* or its equivalent revision or replacement.

1.10 Laboratory Safety

It is the policy of PASI to make safety and health an integral part of daily operations and to ensure that all employees are provided with safe working conditions, personal protective equipment, and requisite training to do their work without injury. Each employee is responsible for his/her own safety by complying with established company rules and procedures. These rules and procedures as well as a more detailed description of the employees' responsibilities are contained in the corporate Safety Manual and Chemical Hygiene Plan.

1.11 Security and Confidentiality

Security is maintained by controlled access to laboratory buildings. Exterior doors to laboratory buildings remain either locked or continuously monitored by PASI staff. Keyless door-lock combinations (and computer access codes/logins) are changed on whenever employees quit or are terminated. Posted signs direct visitors to the reception office and mark all other areas as off limits to unauthorized personnel. All visitors to the facility must sign the Visitor's Logbook maintained by the receptionist. A staff member will accompany them during the duration of their stay on the premises unless the GM, QM or TD specify otherwise. In this instance, the staff member will escort the visitor back to the reception area at the end of his/her visit where he/she signs out. The last staff member to leave their department for the day should ensure that all outside access points to that area are secure.

Additional security is provided where necessary, e.g., specific secure areas for sample, data and customer report storage, as requested by customers or cases where national security is of concern. These areas are lockable within the facilities, or are in secure offsite storage. Access is limited to specific individuals or their designees. Security of sample storage areas is the responsibility of the Sample Custodian. Security of samples and data during analysis and data reduction is the responsibility of Group Supervisors. Security of customer report archives is the responsibility of the Client Services Manager. These secure areas are locked whenever these individuals or their designees are not present in the facility.

Access to designated laboratory sample storage locations is limited to authorized personnel only. Provisions for lock and key access are provided. No samples are to be removed without proper authorization. If requested by customer or contract, samples are not to be removed from secure storage areas without filling out the associated internal Chain-of-Custody records.

Standard business practices of confidentiality are applied to all documents and information regarding customer analyses. Specific protocols for handling confidential documents are described in PASI SOPs. Additional protocols for internal identification of samples and data by number only are implemented as required under contract specific Quality Assurance Project Plans (QAPPs).

All information pertaining to a particular customer, including national security concerns will remain confidential. Data will be released to outside agencies only with written authorization from the customer or where federal or state law requires the company to do so (i.e. federal or state subpoena).

2.0 SAMPLE CUSTODY

2.1 Sampling Support

Each individual PASI laboratory provides shipping containers, sample containers (including applicable chemical preservatives), custody documents, and field quality control samples (e.g., trip blanks) to support field-sampling events. Guidelines for sample container types, preservatives, and holding times for a variety of methods are listed in Attachment VIII. Note that all analyses listed are not necessarily performed at all PASI locations and there may be additional laboratory analyses performed that are not included in these tables. PASI - Indianapolis may provide pick-up and delivery services to their customers when needed.

2.2 Field Services Division

Pace Analytical has a large Field Services Division which is based in their Minneapolis facility as well as limited field service capabilities in some of the other facilities. Field Services provides comprehensive nationwide service offerings including:

- Stack Testing
- Ambient Air
- CEM Certification Testing
- Air Quality Monitoring
- Onsite Analytical Services- FTIR and GC
- Real-time Process Diagnostic/Optimization Testing
- Wastewater, Groundwater and Drinking Water Monitoring
- Storm water and Surface Water Monitoring
- Soil and Waste Sampling
- Mobile Laboratory Services

The Field Services Division operates under the PASI Corporate Quality System, with applicable and necessary provisions to address the activities, methods, and goals specific to Field Services for a unit specific Quality Program. All procedures and methods used by Field Services are documented in Standard Operating Procedures and Procedure Manuals.

2.3 Project Initiation

Prior to accepting new work, the laboratory reviews performance capability. The laboratory establishes that sufficient resources (personnel, equipment capacity, analytical method capability, etc.) are available to complete the required work. The customer needs and data quality objectives are defined and appropriate environmental test methods are assured to meet customer's requirements by project managers or sales representative. Project Managers review laboratory certifications. Members of the management staff review current instrument capacity, personnel availability and training, analytical procedures capability and projected sample load. Management then informs the sales and client services personnel whether or not the laboratory can accept the new project via written correspondence, email, and/or daily operations meetings.

The laboratory maintains records of all such reviews, including discussions with customers. Routine analytical project documentation of quotes, notes, dates, initials and/or recordings is maintained in a project folder by project management. Conditions for new and more complex contracts are determined by

the General Managers and sales representatives. Quality Management is consulted on technical requirements and operations staff provides input on volume capacities. Evidence of these reviews is maintained in the form of awarded Request for Proposals (RFPs), signed quotes or contracts, and a Customer Relationship Management (CRM) database. If a review identifies a potential mismatch between customer requirements and laboratory capabilities and/or capacities, Pace will specify its level of commitment by listing these exceptions to the requirements within the RFP, quote or contract.

2.4 Chain-Of-Custody

A chain-of-custody (COC) (see Attachment VII) document provides the legal documentation of samples from time of collection to completion of analysis. Importance is stressed on completeness of COCs. PASI has implemented Standard Operating Procedures to ensure that sample custody traceability and responsibility objectives are achieved for every project.

Field personnel or client representatives complete a chain-of-custody form for all samples. Samples are received by the laboratory accompanied by these forms.

If sample shipments are not accompanied by the correct documentation, the Sample Receiving department notifies a Project Manager. The Project Manager then obtains the correct documentation/information from the customer in order for analysis of samples to proceed.

The sampler is responsible for providing the following information on the chain-of-custody form:

- Customer project name
- Project location or number
- Field sample number/identification
- Date and time sampled
- Sample type (matrix)
- Preservative
- Requested analyses
- Sampler signature
- Relinquishing signature
- Date and time relinquished
- Sampler remarks (if applicable)
- Custody Seal Number (if applicable)
- Regulatory Program Designation
- The state where the samples were collected to ensure all applicable state requirements are met
- Turnaround time requested
- Purchase order number

The record is filled out completely and legibly with indelible ink. Errors are corrected by drawing a single line through the initial entry and initialing and dating the change. All transfers of samples are recorded on the chain-of-custody in the “relinquished” and “received by” sections. All information except signatures is printed.

Additional information can be found in SOP S-IN-C-001 *Sample Management* or its equivalent revision or replacement.

2.5 Sample Acceptance Policy

In accordance with regulatory guidelines, PASI complies with the following sample acceptance policy for all samples received.

If the samples do not meet the sample receipt acceptance criteria outlined below, the laboratory is required to document all non-compliances, contact the customer, and either reject the samples or fully document any decisions to proceed with analyses of samples which do not meet the criteria. Any results reported from samples not meeting these criteria are appropriately qualified on the final report.

All samples must:

- Have unique customer identification that are clearly marked with durable waterproof labels on the sample containers and that match the chain of custody.
- Have clear documentation on the chain of custody related to the location of the sampling site with the time and date of sample collection.
- Have the sampler's name and signature
- Have the requested analyses clearly marked
- Have clear documentation of any special analysis requirements (data deliverables, etc.);
- Be in appropriate sample containers with clear documentation of the preservatives used.
- Be correctly preserved unless method allows for laboratory preservation.
- Be received within holding time. Any samples with hold times that are exceeded will not be processed without prior customer permission.
- Have sufficient sample volume to proceed with the analytical testing. If insufficient sample volume is received, analysis will not proceed without customer approval.
- Be received within appropriate temperature ranges - not frozen but $\leq 6^{\circ}\text{C}$ (See Note 1), unless program requirements or customer contractual obligations mandate otherwise (see Note 2). The cooler temperature is recorded directly on the COC and the SCUR. Samples that are delivered to the lab immediately after collection are considered acceptable if there is evidence that the chilling process has been started, for example by the arrival of the samples on ice. If samples arrive that are not compliant with these temperature requirements, the customer will be notified. The analysis will NOT proceed unless otherwise directed by the customer. If less than 72 hours remain in the hold time for the analysis, the analysis may be started while the customer is contacted to avoid missing the hold time. Data will be appropriately qualified on the final report.

Note 1: Temperature will be read and recorded based on the precision of the measuring device. For example, temperatures obtained from a thermometer graduated to 0.1°C will be read and recorded to $\pm 0.1^{\circ}\text{C}$. Measurements obtained from a thermometer graduated to 0.5°C will be read to $\pm 0.5^{\circ}\text{C}$. Measurements read at the specified precision are not to be rounded down to meet the $\leq 6^{\circ}\text{C}$ limit (i.e. 6.2°C rounded and recorded as 6°C).

Note 2: Some microbiology methods allow sample receipt temperatures of up to 10°C . Consult the specific method for microbiology samples received above 6°C prior to initiating corrective action for out of temperature preservation conditions.

Upon sample receipt, the following items are also checked and recorded:

- Presence of custody seals or tapes on the shipping containers
- Sample condition: Intact, broken/leaking
- Sample holding time
- Sample pH when required
- Appropriate containers

Samples for drinking water analysis that are improperly preserved, or are received past holding time, are rejected at the time of receipt, with the exception of VOA samples that are tested for pH at the time of analysis.

Additional information can be found in SOP S-IN-C-001 **Sample Management** or its equivalent revision or replacement.

2.6 Sample Log-in

After sample inspection, all sample information on the chain-of-custody is entered into the Laboratory Information Management System (LIMS).

This permanent record documents receipt of all sample containers including:

- Customer name and contact
- Customer number
- Pace Analytical project number
- Pace Analytical Project Manager
- Sample descriptions
- Due dates
- List of analyses requested
- Date and time of lab receipt
- Field ID code
- Date and time of collection
- Any comments resulting from inspection for sample rejection

All samples received are logged into the LIMS system within one working day of receipt. Sample login may be delayed due to customer clarification of analysis needed, corrective actions for sample receipt non-conformance, or other unusual circumstances. If the time collected for any sample is unspecified and Pace is unable to obtain this information from the customer, the laboratory will use 08:00 as the time sampled. All hold times will be based on this sampling time and qualified accordingly if exceeded.

The Laboratory Information Management System (EPIC Pro) automatically generates a unique identification number for each sample created in the system. The LIMS sample number follows the general convention of BB-XXXXX-YYY. The BB represents the laboratory identification within Pace's laboratory network. The 5 digit "X" number represents the project number followed by a 3 digit sample number. The project number is a sequential number that is assigned as a new project is created. The sample number corresponds to the number of samples submitted by the client. In addition to the unique sample ID, there is a sample container ID that consists of the sample number, the container type (ex. BP1U), and bottle 1 of Y, where Y represent the total number of containers of that particular type. Together the sample LIMS number and sample container ID number create a unique barcode encryption that can be linked to the sample analysis requested by the client. This unique identification number is placed on the sample container as a durable label and becomes the link between the laboratory's sample management system and the client's field identification; it will be a permanent reference number for all future interactions.

Sample labels are printed from the LIMS system and affixed to each sample container.

Samples with hold times that are near expiration date/time may be sent directly to the laboratory for analysis at the discretion of the Project Manager and/or General Manager.

Additional information can be found in SOP S-IN-C-001 **Sample Management** or its equivalent revision or replacement.

2.7 Sample Storage

2.7.1 Storage Conditions

Samples are stored away from all standards, reagents, or other potential sources of contamination. Samples are stored in a manner that prevents cross-contamination (e.g. volatile samples are stored separate from other samples). All sample fractions, extracts, leachates and other sample preparation products are stored in the same manner as actual samples or as specified by the analytical method.

2.7.2 Temperature Monitoring

Samples are taken to the appropriate storage location (ambient, refrigerator, freezer) immediately after sample receipt and check-in procedures are completed. All sample storage areas are located in limited access areas and are monitored to ensure sample integrity.

The temperature of each refrigerated storage area is maintained at $\leq 6^{\circ}\text{C}$ unless state or program requirements differ. The temperature of each freezer storage area is maintained at $< -10^{\circ}\text{C}$ unless state or program requirements differ. The temperature of each storage area is monitored and recorded each workday. If the temperature falls outside the acceptable limits, the following corrective actions are taken and appropriately documented:

- The temperature is rechecked after two hours to verify temperature exceedance. Corrective action is initiated if necessary.
- The Quality Manager and/or laboratory management are notified if the problem persists.
- The samples are relocated to a proper environment if the temperature cannot be maintained after corrective actions are implemented.
- The affected customers are notified.
- Documentation is provided on analytical report.

2.7.3 Hazardous Materials

Pure product or potentially heavily contaminated samples are tagged as "hazardous" or "lab pack" and are stored separately from other samples.

2.7.4 Foreign/Quarantined Soils

Depending on the soil disposal practices of the laboratory, foreign soils and soils from USDA regulated areas are segregated. The USDA requires these samples to be incinerated or sterilized by an approved treatment procedure.

Additional information can be found in SOP S-IN-C-001 *Sample Management* or its equivalent revision or replacement.

2.8 Sample Protection

PASI laboratory facilities are operated under controlled access to ensure sample and data integrity. Visitors must register at the front desk and be properly escorted.

Samples are removed from storage areas by designated personnel and returned to the storage areas, if necessary, immediately after the required sample quantity has been taken.

Upon customer request, additional and more rigorous chain of custody protocols for samples and data can be implemented. For example, some projects may require complete documentation of sample custody within the secure laboratory.

Additional information can be found in SOP S-IN-C-001 *Sample Management* or its equivalent revision or replacement.

2.9 Subcontracting Analytical Services

Every effort is made to perform chemical analyses for PASI customers within the laboratory that receives the samples. When subcontracting to a laboratory other than the receiving laboratory (inside or outside the PASI network) becomes necessary, a preliminary verbal communication with an appropriate laboratory is undertaken. Customers are notified in writing of the lab's intention to subcontract any portion of the testing to another laboratory. Work performed under specific protocols may involve special considerations.

Prior to subcontracting samples to a laboratory outside Pace Analytical, the potential sub-contract laboratory will be pre-qualified by verifying that the subcontractor meets the following criteria:

- All certifications required for the proposed subcontract are in effect,
- Sufficient professional liability and other required insurance coverage is in effect, and
- Is not involved in legal action by any federal, state, or local government agency for data integrity issues and has not been convicted in such investigation at any time during the past 5 years.

The contact and preliminary arrangements are made between the PASI Project Manager and the appropriate subcontract laboratory personnel. The specific terms of the subcontract laboratory agreement include :

- Method of analysis
- Number and type of samples expected
- Project specific QA/QC requirements
- Deliverables required
- Laboratory certification requirement
- Price per analysis
- Turnaround time requirements

Chain-of-custody forms are generated for samples requiring subcontracting to other laboratories. Sample receiving personnel re-package the samples for shipment, create a transfer chain-of-custody form and record the following information:

- Pace Analytical Laboratory Number
- Matrix
- Requested analysis
- Special instructions (quick turn-around, required detection or reporting limits, unusual information known about the samples or analytical procedure).
- Signature in "Relinquished By"

All subcontracted sample data reports are sent to the PASI Project Manager.

Any Pace Analytical work sent to other labs within the PASI network is handled as subcontracted work (also known as inter-regional) and all final reports are labeled clearly with the name of the laboratory performing the work. Any non-NELAC work is clearly identified. PASI will not be responsible for analytical data if the subcontract laboratory was designated by the customer.

Additional information can be found in SOP S-IN-C-003 *Subcontracting Samples* or its equivalent revision or replacement.

2.10 Sample Retention and Disposal

Samples (and sample by-products) must be retained by the laboratory for a period of time necessary to protect the integrity of the sample or sample by-product (e.g. method holding time) and to protect the interests of the laboratory and the customer.

Unused portions of samples are retained by each laboratory based on program or customer requirements for sample retention and storage. The sample retention time is a minimum of 45 days from receipt of the samples. Samples requiring storage beyond this time due to special requests or contractual obligations will not be stored under temperature controlled conditions unless the laboratory has sufficient capacity and their presence does not compromise the integrity of other samples.

After this period expires, non-hazardous samples are properly disposed of as non-hazardous waste. The preferred method for disposition of hazardous samples is to return the excess sample to the customer. If it is not feasible to return samples, or the customer requires PASI to dispose of excess samples, PASI will arrange for proper disposal by an approved contractor.

Additional information can be found in SOP S-ALL-S-002 *Waste Handling* and S-IN-C-001 *Sample Management* or their equivalent revisions or replacements.

3.0 ANALYTICAL CAPABILITIES

3.1 Analytical Method Sources

PASI laboratories are capable of analyzing a full range of environmental samples from a variety of matrices, including air, surface water, wastewater, groundwater, soil, sediment, biota, and other waste products. The latest valid editions of methodologies are applied from regulatory and professional sources including EPA, ASTM, USGS, NIOSH, and State Agencies. Section 11 of this manual is a representative listing of general analytical protocol references. PASI discloses in writing to its customers and regulatory agencies any instances in which modified methods are being used in the analysis of samples.

In the event of a customer-specific need, instrumentation constraint or regulatory requirement, PASI laboratories reserve the right to use valid versions of methods that may not be the most recent edition available.

3.2 Analytical Method Documentation

The primary form of documentation of analytical methods is the Standard Operating Procedure (SOP). SOPs contain pertinent information as to what steps are required by an analyst to successfully perform a procedure. The required contents for the SOPs are specified in the company-wide SOP for Preparation of SOPs (S-ALL-Q-001).

The SOPs may be supplemented by other training materials that further detail how methods are specifically performed. This training material will undergo periodic, documented review along with the other Quality System documentation.

3.3 Analytical Method Validation

In some situations, PASI develops and validates methodologies that may be more applicable to a specific problem or objective. When non-standard methods (e.g. methods other than EPA, NIOSH, ASTM, AOAC, etc.) are required for specific projects or analytes of interest, or when the laboratory develops a method, or modifies a standard method, the laboratory validates the method prior to applying it to customer samples. Method validity is established by meeting criteria for precision and accuracy as established by the data quality objectives specified by the end user of the data. The laboratory records the validation procedure, the results obtained and a statement as to the usability of the method. The minimum requirements for method validation include determination of the limit of detection and limit of quantitation, evaluation of precision and bias, and evaluation of selectivity of each analyte of interest.

3.4 Demonstration of Capability (DOC)

Analysts complete an initial demonstration of capability (IDOC) study prior to performing a method or when there is a change in instrument type, personnel or test method (when a defined 'work cell' is in operation, the entire work cell must meet the criteria). The mean recovery and standard deviation of each analyte, taken from 4 replicates of a quality control standard is calculated and compared to method criteria (if available) or established lab criteria for evaluation of acceptance. Each laboratory maintains copies of all demonstrations of capability and corresponding raw data for future reference and must document the acceptance criteria prior to the analysis of the DOC. Demonstrations of capability are verified on an annual basis.

Alternative demonstration of capability procedures may be used for IDOC for methods that don't lend themselves to the "4 replicate" approach. For methods that only measure precision, the precision of four laboratory duplicate pairs will be assessed. The relative percent differences must be within the method

acceptance limits. For procedures like TCLP or SPLP, the analyst will demonstrate making the buffered solution and performing the tumbling process. The trainer or supervisor will sign-off on demonstration of capability of the tumbling process. Additional demonstration of capability options will be specified in Section 14 – Method Performance of the applicable method SOP.

For Continuing Demonstrations of Capability, the laboratories may use Performance Testing (PT) samples or any of the approaches utilized for IDOCs. For methods or procedures that do not lend themselves to the “4 replicate” approach, the demonstration of capability requirements will be specified in Section 14 – Method Performance of the applicable SOP.

3.5 Regulatory and Method Compliance

PASI understands that expectations of our customers commonly include the assumption that laboratory data will satisfy specific regulatory requirements. Therefore PASI attempts to ascertain, prior to beginning a project, what applicable regulatory jurisdiction, agency, or protocols apply to that project. This information is also required on the Chain-of-Custody submitted with samples.

PASI makes every effort to detect regulatory or project plan inconsistencies, based upon information from the customer, and communicate them immediately to the customer in order to aid in the decision-making process. PASI will not be liable if the customer chooses not to follow PASI recommendations.

It is PASI policy to disclose in a forthright manner any detected noncompliance affecting the usability of data produced by our laboratories. The laboratory will notify customers within 30 days of fully characterizing the nature of the nonconformance, the scope of the nonconformance and the impact it may have on data usability.

4.0 QUALITY CONTROL PROCEDURES

4.1 Data Integrity System

The data integrity system at PASI provides assurances to management that a highly ethical approach is being applied to all planning, training and implementation of methods. Data integrity is crucial to the success of our company and Pace Analytical is committed to providing a culture of quality throughout the organization. To accomplish this goal, PASI has implemented a data integrity system that encompasses the following four requirements:

1. A data integrity training program: Standardized training is given to each new employee and a yearly refresher is presented to all employees. Key topics within this training include:
 - Need for honesty in analytical reporting
 - Process for reporting data integrity issues
 - Specific examples of unethical behavior and improper practices
 - Documentation of non-conforming data that is still useful to the data user
 - Consequences and punishments for unethical behavior
 - Examples of monitoring devices used by management to review data and systems
2. Signed data integrity documentation for all employees: This includes a quiz following the Ethics training session and written agreement to abide by the Code of Ethics and Standards of Conduct explained in the employee manual. The quiz along with the employee's electronic signature of agreement are maintained within the Learning Management System.
3. In-depth, periodic monitoring of data integrity: Including peer data review and validation, internal data audits, proficiency testing studies, etc.
4. Documentation of any review or investigation into possible data integrity infractions. This documentation, including any disciplinary actions involved, corrective actions taken, and notifications to customers must be available for review for lab assessors and must be retained for a minimum of five years.

PASI management makes every effort to ensure that personnel are free from any undue pressures that affect the quality of their work including commercial, financial, over-scheduling, and working condition pressures.

Corporate management also provides all PASI facilities a mechanism for confidential reporting of data integrity issues that ensures confidentiality and a receptive environment in which all employees are comfortable discussing items of ethical concern. The anonymous message line is monitored by the Corporate Director of Quality, Safety and Training who will ensure that all concerns are evaluated and, where necessary, brought to the attention of executive management and investigated. **The message line voice mail box is available at 612-607-6427.**

4.2 Method Blank

A method blank is used to evaluate contamination in the preparation/analysis system. The method blank is processed through all preparation and analytical steps with its associated samples.

A method blank is processed at a minimum frequency of 1 per preparation batch. In the case of a method that has no separate preparation step (e.g. volatiles), a method blank is processed with no more than 20 samples of a specific matrix performed by the same analyst, in the same method, using the same standards or reagents.

The method blank consists of a matrix similar to the associated samples that is known to be free of the analytes of interest. Laboratories will characterize a representative matrix as "clean" if the matrix contains contaminants at less than ½ the laboratory's reporting limit.

Each method blank is evaluated for contamination. The source of any contamination is investigated and documented corrective action is taken when the concentration of any target analyte is detected above the

reporting limit and is greater than 1/10 of the amount of that analyte found in any associated sample. Corrective actions include the re-preparation and re-analysis of all the samples (where possible) along with the full set of required quality control samples. Data qualifiers must be applied to any result reported that is associated with a contaminated method blank.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

4.3 Laboratory Control Sample

The Laboratory Control Sample (LCS) is used to evaluate the performance of the entire analytical system including preparation and analysis.

An LCS is processed at a minimum frequency of 1 per preparation batch. In the case of a method that has no separate preparation step (e.g. volatiles), an LCS will be processed with no more than 20 samples of a specific matrix performed by the same analyst, in the same method, using the same standards or reagents.

The LCS consists of a matrix similar to the associated samples that is known to be free of the analytes of interest that is then spiked with known concentrations of target analytes.

The LCS contains **all** analytes specified by a specific method or by the customer or regulatory agency (which may include full list of target compounds, with certain exceptions. These exceptions may include analyzing only specific Aroclors when PCB analysis is requested or not spiking with all EPA Appendix compounds when a full Appendix list of compounds is requested). In the absence of specified components, the lab will spike with the following compounds:

- For multi-peak analytes (e.g. PCBs, technical chlordane, toxaphene), a representative standard will be processed.
- For methods with long lists of analytes, a representative number of target analytes may be chosen. The following criteria is used to determine the number of LCS compounds used:
 - For methods with 1-10 target compounds, the lab will spike with all compounds
 - For methods with 11-20 target compounds, the lab will spike with at least 10 compounds or 80%, whichever is greater
 - For methods with greater than 20 compounds, the lab will spike with at least 16 compounds.

The LCS is evaluated against the method default or laboratory-derived acceptance criteria. Derived acceptance criteria can be calculated when the laboratory has a minimum of 20 (preferably greater than 30) data points. Any compound that is outside of these limits is considered to be 'out of control' and must be qualified appropriately. Any associated sample containing an 'out-of-control' compound must either be re-analyzed with a successful LCS or reported with the appropriate data qualifier.

For LCSs containing a large number of analytes, it is statistically likely that a few recoveries will be outside of control limits (the mean recovery $\pm 3 \times$ the standard deviation). This does not necessarily mean that the system is out of control, and therefore no corrective action would be necessary (except for proper documentation). NELAC has allowed for a minimum number of marginal exceedances. The number of allowable exceedances depends on the number of compounds in the LCS. If more analyte recoveries exceed the LCS control limits than is allowed (see below), then the LCS is considered non-compliant and corrective actions are necessary. The number of allowable exceedances is as follows:

- >90 analytes in the LCS- 5 analytes
- 71-90 analytes in the LCS- 4 analytes
- 51-70 analytes in the LCS- 3 analytes
- 31-50 analytes in the LCS- 2 analytes
- 11-30 analytes in the LCS- 1 analyte
- <11 analytes in the LCS- no analytes allowed out)

A matrix spike (MS) can be used in place of a non-compliant LCS in a batch as long as the MS passes the LCS acceptance criteria (this is a NELAC allowance). When this happens, full documentation must be made available to the data user. If this is not allowed by a customer or regulatory body, the associated samples must be rerun with a compliant LCS (if possible) or reported with appropriate data qualifiers.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

4.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A matrix spike (MS) is used to determine the effect of the sample matrix on compound recovery for a particular method. The information from these spikes is sample or matrix specific and is not used to determine the acceptance of an entire batch (see LCS).

A **Matrix Spike/Matrix Spike Duplicate (MS/MSD)** set is processed at a frequency specified in a particular method or as determined by a specific customer. This frequency will be specified in the applicable method SOP or customer QAPP. In the absence of such requirements, an MS/MSD set is routinely analyzed once per every 20 samples per general matrix (i.e. soil, water, biota, etc.) per method.

The MS and MSD consist of the sample matrix that is then spiked with known concentrations of target analytes. Lab personnel spike customer samples that are specifically designated as MS/MSD samples or, when no designated samples are present in a batch, randomly select samples to spike that have adequate sample volume or weight. Spiked samples are prepared and analyzed in the same manner as the original samples and are selected from different customers if possible.

The MS and MSD contain all analytes specified by a specific method or by the customer or regulatory agency. In the absence of specified components, the lab will spike with the same number of compounds as previously discussed in the LCS section.

The MS and MSD are evaluated against the method or laboratory-derived criteria. Any compound that is outside of these limits is considered to be 'out of control' and must be qualified appropriately. Batch acceptance, however, is based on method blank and LCS performance, not on MS/MSD recoveries. The spike recoveries give the data user a better understanding of the final results based on their site-specific information.

A matrix spike and sample duplicate will be performed instead of a matrix spike and matrix spike duplicate when specified by the customer or method.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

For **Ohio VAP projects**, the laboratory must minimize the use of qualified data. In the case of MS/MSD failures, the lab is required to rerun the associated samples only when the associated LCS also fails acceptance criteria and if there is sufficient sample remaining. When an LCS is acceptable and the MS results are outside of criteria, and no system anomaly is detected, the samples will be qualified as being affected by the sample matrix and the sample data can be reported. The end user can then determine the extent of the matrix effect on their sample results. The lab must make every effort to take the appropriate corrective actions and resolve any anomalies regarding the MS/MSDs for Ohio VAP projects.

4.5 Surrogates

Surrogates are compounds that reflect the chemistry of target analytes and are typically added to samples for organic analyses to monitor the effect of the sample matrix on compound recovery.

Surrogates are added to each customer sample (for organics), method blank, LCS and MS prior to extraction or analysis. The surrogates are evaluated against the method or laboratory-derived acceptance criteria. Any surrogate compound that is outside of these limits is considered to be 'out of control' and must be qualified appropriately. Samples with surrogate failures are typically re-extracted and/or re-analyzed to confirm that the out-of-control value was caused by the matrix of the sample and not by some other systematic error. An exception to this would be samples that have high surrogate values but no reportable hits for target compounds. These samples would be reported, with a qualifier, because the implied high bias would not affect the final results.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

For **Ohio VAP** projects, the lab must minimize the use of qualified data. In the case of surrogate failures, the lab is required to rerun the associated samples to confirm that a matrix effect is present (if there is sufficient sample remaining).). The lab must make every effort to take the appropriate corrective actions and resolve any anomalies regarding surrogates for Ohio VAP projects

4.6 Sample Duplicate

A sample duplicate is a second portion of sample that is prepared and analyzed in the laboratory along with the first portion. It is used to measure the precision associated with preparation and analysis. A sample duplicate is processed at a frequency specified by the particular method or as determined by a specific customer.

The sample and duplicate are evaluated against the method or laboratory-derived criteria for relative percent difference (RPD). Any duplicate that is outside of these limits is considered to be 'out of control' and must be qualified appropriately.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

For **Ohio VAP** projects, the lab must minimize the use of qualified data. In the case of duplicate samples exceeding the RPD criteria, the lab is required to rerun the associated sample and duplicate as long as no sampling error was detected (if there is sufficient sample remaining). If the sample and duplicate still do not agree, a comment would be made stating there is a sample anomaly (i.e. non-homogeneous). The lab must make every effort to take the appropriate corrective actions and resolve any anomalies regarding sample duplicates for Ohio VAP projects

4.7 Internal Standards

Internal Standards are method-specific analytes added to every standard, method blank, laboratory control sample, matrix spike, matrix spike duplicate, and sample at a known concentration, prior to analysis for the purpose of adjusting the response factor used in quantifying target analytes. At a minimum, the laboratory will follow method specific guidelines for the treatment of internal standard recoveries as they are related to the reporting of data.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

For **Ohio VAP** projects, samples with internal standard failures (outside the method criteria already established for CCV internal standards) must be rerun to confirm sample matrix effect. The lab must

make every effort to take the appropriate corrective actions and resolve any anomalies regarding internal standards for Ohio VAP projects

4.8 Field Blanks

Field blanks are blanks prepared at the sampling site in order to monitor for contamination that may be present in the environment where samples are collected. These field quality control samples are often referenced as field blanks, rinseate blanks, or equipment blanks. The lab analyzes these field blanks as normal samples and informs the customer if there are any target compounds detected above the reporting limit.

4.9 Trip Blanks

Trip blanks are blanks that originate from the laboratory as part of the sampling event and are used to monitor for contamination of samples during transport. These blanks accompany the empty sample containers to the field and then accompany the collected samples back to the lab. These blanks are routinely analyzed for volatile methods where ambient background contamination is likely to occur.

4.10 Limit of Detection (LOD)

PASI laboratories are required to use a documented procedure to determine a limit of detection (LOD) for each analyte of concern in each matrix reported. All sample-processing steps of the preparation and analytical methods are included in this determination. For any test that does not have a valid LOD, sample results below the limit of quantitation (LOQ) cannot be reported.

The LOD is initially established for the compounds of interest for each method in a clean matrix with no target analytes present and no interferences at a concentration that would impact the results. The LOD is then determined every time there is a change in the test method that affects how the test is performed or when there has been a change in the instrument that affects the sensitivity. If required by customer, method or accreditation body, the LOD will be re-established annually for all applicable methods.

Unless otherwise noted, the method used by PASI laboratories to determine LODs is based on the Method Detection Limit (MDL) procedure outlined in 40 CFR Part 136, Appendix B. Where required by regulatory program or customer, the above referenced procedure will be followed.

Where specifically stated in the published method, LODs (or MDLs) will be performed at the listed frequency.

The validity of the LOD must be verified by detection (a value greater than zero) of the analytes in a QC sample in each quality system matrix. The QC sample must contain the analyte at no more than 3x the LOD for a single analyte test and 4x the LOD for multiple analyte tests. This verification must be performed on each instrument used for sample analysis and reporting of data. The validity of the LOD must be verified as part of the LOD determination process. This verification must be done prior to the use of the LOD for sample analysis.

An LOD study is not required for any analyte for which spiking solutions or quality control samples are not available (e.g. temperature).

The LOD, if required, shall be verified annually for each quality system matrix, technology and analyte. In lieu of performing full LOD (MDL) studies annually, the lab can verify the LOD (MDL) on an annual basis, providing this verification is fully documented and does not contradict other customer or program requirements that the lab must follow. The requirements of this verification are:

- The spike concentration of the verification must be no more than 3x times the LOD for single analyte tests and 4x the LOD for multiple analyte tests.
- The lab must verify the LOD on each instrument used for the reporting of sample data.

- The lab must be able to qualitatively identify all target analytes in the verification standard (distinguishable from noise).

Additional information can be found in *SOP S-ALL-Q-004 Method Detection Limit Studies* or its equivalent revision or replacement.

For Ohio VAP projects, a valid MDL must be in place prior to sample analysis. MDLs must be spiked at a concentration not to exceed the reporting limit.

4.11 Limit of Quantitation (LOQ)

A limit of quantitation (LOQ) for every analyte of concern must be determined. For PASI laboratories, this LOQ is referred to as the RL, or Reporting Limit. This RL is based on the lowest calibration standard concentration that is used in each initial calibration. Results below this level are not allowed to be reported without qualification since the results would not be substantiated by a calibration standard. For methods with a determined LOD, results can be reported out below the LOQ but above the LOD if they are properly qualified (e.g. J flag).

There must be a sufficient buffer between the LOD and the limit of quantitation (LOQ). The LOQ must be higher than the LOD.

To verify the LOQ, the laboratory will prepare a sample in the same matrix used for the LCS. The sample will be spiked with target analytes at the concentration(s) equivalent to or less than the RL(s). This sample must undergo the routine sample preparation procedure including any routine sample cleanup steps. The sample is then analyzed and the recovery of each target analyte determined. The recovery for each target analyte must meet the laboratories current control limits.

Additional information can be found in *SOP S-ALL-Q-004 Method Detection Limit Studies* or its equivalent revision or replacement.

4.12 Estimate of Uncertainty

PASI laboratories can provide an estimation of uncertainty for results generated by the laboratory. The estimate quantifies the error associated with any given result at a 95% confidence interval. This estimate does not include bias that may be associated with sampling. The laboratory has a procedure in place for making this estimation. In the absence of a regulatory or customer-specific procedure, PASI laboratories base this estimation on the recovery data obtained from the Laboratory Control Spikes. The uncertainty is a function of the mean recovery $\pm 2x$ the standard deviation.

The measurement of uncertainty is provided only on request by the customer, as required by specification or regulation and when the result is used to determine conformance within a specification limit.

4.13 Proficiency Testing (PT) Studies

PASI laboratories participate in the NELAC-defined proficiency testing program. PT samples are obtained from approved providers and analyzed and reported at a minimum of two times per year for the relevant fields of testing per matrix.

The lab initiates an investigation whenever PT results are deemed 'unacceptable' by the PT provider. All findings and corrective actions taken are reported to the Quality Manager. A corrective action plan (including re-analysis of similar samples) is initiated and this report is sent to the appropriate state accreditation agencies for their review.

PT samples are treated as typical customer samples, utilizing the same staff, methods, equipment, facilities, and frequency of analysis. PT samples are included in the laboratory's normal analytical processes and do not receive extraordinary attention due to their nature.

Comparison of analytical results with anyone participating in the same PT study is prohibited prior to the close of the study.

Additional information can be found in SOP S-ALL-Q-010 *PE/PT Program* or its equivalent revision or replacement.

4.14 Rounding and Significant Figures

In general, the PASI laboratories report data to no more than three significant digits. Therefore, all measurements made in the analytical process must reflect this level of precision. In the event that a parameter that contributes to the final result has less than three significant figures of precision, the final result must be reported with no more significant figures than that of the parameter in question. The rounding rules listed below are descriptive of the LIMS and not necessarily of any supporting program (Excel, etc.).

Rounding

PASI-Indianapolis follows the odd / even guidelines for rounding numbers:

- If the figure following the one to be retained is less than five, that figure is dropped and the retained ones are not changed (with three significant figures, 2.544 is rounded to 2.54).
- If the figure following the ones to be retained is greater than five, that figure is dropped and the last retained one is rounded up (with three significant figures, 2.546 is rounded to 2.55).
- If the figure following the ones to be retained is five and if there are no figures other than zeros beyond that five, then the five is dropped and the last figure retained is unchanged if it is even and rounded up if it is odd (with three significant figures, 2.525 is rounded to 2.52 and 2.535 is rounded to 2.54).

Significant Digits

PASI-Indianapolis follows the following convention for reporting to a specified number of significant figures. Unless specified by federal, state or local requirements or on specific request by a customer, the laboratory reports:

- Values > 10 – Reported to 3 significant digits
- Values ≤ 10 – Reported to 2 significant digits

5.0 DOCUMENT MANAGEMENT AND CHANGE CONTROL

5.1 Document Management

Additional information can be found in SOP S-ALL-Q-002 *Document Management* or its equivalent revision or replacement.

Pace Analytical Services, Inc. has an established procedure for managing documents that are part of the quality system. The list of managed documents includes, but is not limited to, Standard Operating Procedures, Quality Assurance Manuals, quality policy statements, training documents, work-processing documents, charts, posters, memoranda, notices, forms, software, and any other procedures, tables, plans, etc. that have a direct bearing on the quality system.

A master list of all managed documents is maintained at each facility identifying the current revision status and distribution of the controlled documents. This establishes that there are no invalid or obsolete documents in use in the facility. All documents are reviewed periodically and revised if necessary. Obsolete documents are systematically discarded or archived for audit or knowledge preservation purposes.

Each managed document is uniquely identified to include the date of issue, the revision identification, page numbers, the total number of pages and the issuing authorities. For complete information on document numbering, refer to SOP S-ALL-Q-003 *Document Numbering*.

As an alternative to the hard copy system of controlled documents, secured electronic copies of controlled documents may be maintained on the local or wide-area network (LAN or WAN). These document files must be read-only for all personnel except the Quality Department and system administrator. Other requirements for this system are as follows:

- Electronic documents must be readily accessible to all facility employees.
- Electronic documents (i.e. pdf's) must be locked from printing. All hardcopy SOPs must be obtained from the Quality Department.

5.1.1 Quality Assurance Manual (QAM)

The Quality Assurance Manual is the company-wide document that describes all aspects of the quality system for PASI. The base QAM template is distributed by the Corporate Quality Department to each of the regional Quality Managers. The regional management personnel modify the necessary and permissible sections of the base template and submit those modifications to the Corporate Director of Quality for review. Once approved and signed by both the CEO and the Director of Quality, the General Manager, Quality Manager and Technical Director(s) sign the Quality Assurance Manual. Each regional Quality Manager is then in charge of distribution to employees, external customers or regulatory agencies and maintaining a distribution list of controlled document copies. The Quality Assurance Manual template is reviewed on an annual basis by all of the PASI Quality Managers and revised accordingly by the Director of Quality, Safety and Training.

5.1.2 Standard Operating Procedures (SOPs)

SOPs fall into two categories: company-wide documents (starting with the prefix S-ALL-) and facility-specific documents (starting with the individual facility prefix).

The purpose of the company-wide SOPs is to establish policies and procedure that are common and applicable to all PASI facilities. Company-wide SOPs are document-controlled by the corporate quality office and signed copies are distributed to all of the regional Quality Managers.

The regional management personnel sign the company-wide SOPs. The regional Quality Manager is then in charge of distribution to employees, external customers or regulatory agencies and maintaining a distribution list of controlled document copies.

Regional PASI facilities are responsible for developing facility-specific SOPs applicable to their respective facility. The regional facility develops these facility-specific SOPs based on the corporate-wide SOP template. This template is written to incorporate a set of minimum method requirements and PASI best practice requirements. The regional facilities may add to or modify the corporate-wide SOP template provided there are no contradictions to the minimum method or best practice requirements. Facility-specific SOPs are controlled by the regional Quality Manager according to the corporate document management policies.

SOPs are reviewed every two years at a minimum (a more frequent review may be required by state or federal agencies or customers). A review of the document does not necessarily constitute a re-issue of a new revision. Documentation of this review and any applicable revisions are made in the last section of each SOP. This provides a historical record of all revisions.

All copies of superseded SOPs are removed from general use and the original copy of each SOP is archived for audit or knowledge preservation purposes. This ensures that all PASI employees use the most current version of each SOP and provides the Quality Manager with a historical record of each SOP.

Additional information can be found in *SOP S-ALL-Q-001 Preparation of SOPs* or its equivalent revision or replacement.

For **Ohio VAP** certification, it is required by the Ohio Administrative Code that the lab must seek Ohio VAP review and approval of all SOPs and modified SOPs prior to implementation.

5.2 Document Change Control

Changes to managed documents are reviewed and approved in the same manner as the original review. Any revision to a document requires the approval of the applicable signatories. After revisions are approved, a revision number is assigned and the previous version of the document is officially retired. Copies may be kept for audit or knowledge preservation purposes.

All controlled copies of the previous document are replaced with controlled copies of the revised document and the superseded copies are destroyed or archived. All affected personnel are advised that there has been a revision and any necessary training is scheduled.

6.0 EQUIPMENT AND MEASUREMENT TRACEABILITY

Each PASI facility is equipped with sufficient instrumentation and support equipment to perform the relevant analytical testing or field procedures performed by each facility. Support equipment includes chemical standards, thermometers, balances, disposable and mechanical pipettes, etc. This section details some of the procedures necessary to maintain traceability and perform proper calibration of instrumentation and support equipment. See Attachment III for a list of equipment currently used at the Indianapolis PASI facility.

6.1 Standards and Traceability

Each PASI facility retains all pertinent information for standards, reagents and chemicals to assure traceability to a national standard. This includes documentation of purchase, receipt, preparation and use.

Upon receipt, all purchased standard reference materials are recorded into a standard logbook or database and assigned a unique identification number. The entries include the facility's unique identification number, the chemical name, manufacturer name, manufacturer's identification numbers, receipt date and expiration date. Vendor's certificates of analysis for all standards, reagents, or chemicals are retained for future reference.

Subsequent preparations of intermediate or working solutions are also documented in a standard logbook or database. These entries include the stock standard name and lot number, the manufacturer name, the solvents used for preparation, the solvent lot number and manufacturer, the preparation steps, preparation date, expiration dates, preparer's initials, and a unique PASI identification number. This number is used in any applicable sample preparation or analysis logbook so the standard can be traced back to the standard preparation record. This process ensures traceability back to the national standard.

All prepared standard or reagent containers include the PASI identification number, the standard or chemical name, the date of preparation, the date of expiration, the concentration with units, and the preparer's initials. This ensures traceability back to the standard preparation logbook.

If a second source standard is required to verify an existing calibration or spiking standard, this standard is purchased from a different supplier. If no second source is available, a second standard from a different lot may be purchased from the same supplier if the lot can be demonstrated as prepared independently from other lots.

Additional information concerning standards and reagent traceability can be found in the SOP S-IN-P-009 **Standard and Reagent Preparation and Traceability** or its equivalent revision or replacement.

6.2 General Analytical Instrument Calibration Procedures

All types of support equipment and instrumentation are calibrated or checked before use to ensure proper functioning and verify that the laboratory's requirements are met. All calibrations are performed by, or under the supervision of, an experienced analyst at scheduled intervals against either certified standards traceable to recognized national standards or reference standards whose values have been statistically validated.

Calibration standards for each parameter are chosen to establish the linear range of the instrument and must bracket the concentrations of those parameters measured in the samples. The lowest calibration standard is the lowest concentration for which quantitative data may be reported. Data reported below this level is considered to have less certainty and must be reported using appropriate data qualifiers (e.g. J flag) or explained in a narrative. The highest calibration standard is the highest concentration for which quantitative data may be reported. Data reported above this level is considered to have less certainty and must be reported using appropriate data qualifiers (e.g. E flag) or explained in the narrative. Any specific method requirement for number and type of calibration standards supersedes the general requirement. Instrument and method specific calibration criteria are explained within the specific analytical standard operating procedures for each facility.

Instrumentation or support equipment that cannot be calibrated to specification or is otherwise defective is clearly labeled as out-of-service until it has been repaired and tested to demonstrate it meets the laboratory's specifications. All repair and maintenance activities including service calls are documented in the maintenance log. Equipment sent off-site for calibration testing is packed and transported to prevent breakage and is in accordance with the calibration laboratory's recommendations.

In the event that recalibration of a piece of test equipment indicates the equipment may have been malfunctioning during the course of sample analysis, an investigation is performed. The results of the investigation along with a summary of the information reviewed are documented and maintained by the Quality Manager. If the investigation indicates sample results have been impacted, the customer is notified within 30 days. This allows for sufficient investigation and review of documentation to determine the impact on the analytical results. Instrumentation found to be consistently out of calibration is either repaired and positively verified or replaced.

Raw data records are retained to document equipment performance. Sufficient raw data is retained to reconstruct the instrument calibration and explicitly connect the continuing calibration verification to the initial calibration.

6.2.1 General Organic Calibration Procedures

Calibration standards are prepared at a minimum of five concentrations for organic analyses. Results from all calibration standards must be included in constructing the calibration curve with the following exceptions:

- The lowest level calibration standard may be removed from the calibration as long as the remaining number of concentration levels meets the minimum established by the method and standard operating procedure. For multi-parameter methods, this may be done on an individual analyte basis. The reporting limit must be adjusted to the lowest concentration included in the calibration curve.
- The highest level calibration standard may be removed from the calibration as long as the remaining number of concentration levels meets the minimum established by the method and standard operating procedure. For multi-parameter methods, this may be done on an individual analyte basis. The upper limit of quantitation must be adjusted to the highest concentration included in the calibration curve.
- Multiple points from either the high end or the low end of the calibration curve may be excluded as long as the remaining points are contiguous in nature and the minimum number of levels remain as established by method or standard operating procedure. The reporting limit or quantitation range, which is appropriate, must be adjusted accordingly.
- Results from a concentration level between the lowest and highest calibration levels can be excluded from the calibration curve for an acceptable cause with approval from the responsible department supervisor if the results for all analytes are excluded and the point is replaced by re-analysis. Re-analysis must occur within the same 12 hour tune time period for GC/MS methodologies and within 8 hours of the initial analysis for non-GC/MS methodologies. All samples analyzed prior to the re-analyzed calibration curve point must be re-analyzed after the calibration curve is completed.

Initial calibration curves are evaluated against appropriate statistical models as required by the analytical methods. Curves that do not meet the appropriate criteria require corrective action that may include re-running the initial calibration curve. All initial calibrations are verified with a standard obtained from a second manufacturer or second lot from the same manufacturer if the lot can be demonstrated as prepared independently from other lots prior to the analysis of samples. Sample results are quantitated from the initial calibration unless otherwise required by regulation, method, or program.

The calibration curve is periodically verified by the analysis of a mid-level continuing calibration verification (CCV) standard during the course of sample analysis. Calibration verification is performed at the beginning and end of each analytical batch (except if an internal standard is used only one verification at the beginning of the batch is needed), whenever it is expected that the analytical system may be out of calibration, if the time period for calibration has expired, or for analytical systems that contain a calibration verification requirement. This verification standard must meet acceptance criteria in order for sample analysis to proceed.

In the event that the CCV does not meet the acceptance criteria, a second CCV may be injected as part of the diagnostic evaluation and corrective action investigation. If the second CCV is acceptable, the analytical sequence is continued. If both CCVs fail, the analytical sequence is terminated. All samples analyzed since the last compliant CCV are re-analyzed for methodologies utilizing external calibration.

When instruments are operating unattended, the autosamplers may be programmed to inject consecutive CCVs as a preventative measure against CCV failure with no corrective action. In this case, both CCVs must be evaluated to determine potential impact to the results. A summary of the decision tree and necessary documentation are listed below:

- If both CCVs meet the acceptance criteria, the analytical sequence is allowed to continue without corrective action. (The 12 hour clock begins with the injection of the second CCV.)
- If the first CCV does not meet the acceptance criteria and the second CCV is acceptable, the analytical sequence is continued and the results are reported.
- If the first CCV meets the acceptance criteria and the second CCV is out of control, the samples preceded by the out of control CCV must be re-analyzed in a compliant analytical sequence.
- If both CCVs are out of control, all samples since the last acceptable CCV must be re-analyzed in a compliant analytical sequence.

Some analytical methods require that samples be bracketed by passing CCVs analyzed both before and after the samples. This is specific to each method but, as a general rule, all external calibration methods require bracketing CCVs. Most internal standard calibrations do not require bracketing CCVs.

Some analytical methods require verification based on a time interval; some methods require a frequency based on an injection interval. The type and frequency of the calibration verifications is dependent on both the analytical method and possibly on the quality program associated with the samples. The type and frequency of calibration verification will be documented in the method specific SOP employed by each laboratory.

For **Ohio VAP** projects, the lab must minimize the use of qualified data. In the case of calibration verification standard failures, the lab is required to rerun the CCV and associated sample so as not to report qualified data (sample data may only be reported if the failure produces a high bias and the samples are non-detect). The lab must make every effort to take the appropriate corrective actions and resolve any anomalies regarding CCVs for Ohio VAP projects

6.2.2 General Inorganic Calibration Procedures

The instrument is initially calibrated with standards at multiple concentrations to establish the linearity of the instrument's response. A calibration blank is also included. Initial calibration curves are evaluated against appropriate statistical models as required by the analytical methods. The number of calibration standards used depends on the specific method criteria or customer project requirements, although normally a minimum of three standards is used.

The ICP and ICP/MS can be standardized with a zero point and a single point calibration if:

- Prior to analysis, the zero point and the single point calibration are analyzed and a linear range is established,
- Zero point and single point calibration standards are analyzed with each batch
- A standard corresponding to the LOQ is analyzed with the batch and meets the established acceptance criteria
- The linearity is verified at the frequency established by the method or manufacturer.

All initial calibrations are verified with a standard obtained from a second manufacturer or second lot from the same manufacturer if the lot can be demonstrated as prepared independently from other lots prior to the analysis of samples. Sample results are quantitated from the initial calibration unless otherwise required by regulation, method, or program.

During the course of analysis, the calibration curve is periodically verified by the analysis of calibration verification standards. A calibration verification standard is analyzed within each analytical batch at method/program specific intervals to verify that the initial calibration is still valid. The CCV is also analyzed at the end of the analytical batch.

A calibration blank is also run with each calibration verification standard to verify the cleanliness of the system. All reported results must be bracketed by acceptable CCVs. Instrument and method specific calibration acceptance criteria are explained within the specific analytical standard operating procedures for each facility.

Interference check standards are also analyzed per method requirements and must meet acceptance criteria for metals analyses.

6.3 Support Equipment Calibration Procedures

All support equipment is calibrated or verified at least annually using NIST traceable references over the entire range of use. The results of calibrations or verifications must be within the specifications required or the equipment will be removed from service until repaired. The laboratory maintains records to demonstrate the correction factors applied to working thermometers.

Prior to use on each working day, balances, ovens, refrigerators, freezers, and water baths are checked in the expected use range with NIST traceable references in order to ensure the equipment meets laboratory specifications.

6.3.1 Analytical Balances

Each analytical balance is checked and (if necessary) calibrated annually by a qualified service technician. The calibration of each balance is checked each day of use with weights traceable to NIST. Calibration weights are ASTM Class 1 (or other class weights that have been calibrated against a NIST standard weight) and are re-certified annually against a NIST traceable reference. Some accrediting agencies may require more frequent checks. If balances are calibrated by an external agency, verification of their weights must be provided. All information pertaining to balance maintenance and calibration is recorded in the individual balance logbook and/or is maintained on file in the Quality department.

6.3.2 Thermometers

Certified, or reference, thermometers are maintained for checking calibration of working thermometers. Reference thermometers are provided with NIST traceability for initial calibration and are re-certified, at a minimum, yearly with equipment directly traceable to NIST.

Working thermometers are compared with the reference thermometers annually according to corporate metrology procedures. Each thermometer is individually numbered and assigned a correction factor based on the NIST reference source. In addition, working thermometers are visually inspected by laboratory personnel prior to use and temperatures are documented.

Laboratory thermometer inventory and calibration data are maintained in the Quality department.

6.3.3 pH/Electrometers

The meter is calibrated before use each day, using fresh buffer solutions.

6.3.4 Spectrophotometers

During use, spectrophotometer performance is checked at established frequencies in analysis sequences against initial calibration verification (ICV) and continuing calibration verification (CCV) standards.

6.3.5 Mechanical Volumetric Dispensing Devices

Mechanical volumetric dispensing devices including bottle top dispensers, pipettes, and burettes, excluding Class A volumetric glassware, are checked for accuracy on a quarterly basis at a minimum. The accuracy of glass microliter syringes is verified and documented prior to use.

Additional information regarding calibration and maintenance of laboratory support equipment can be found in SOP S-IN-Q-157 *Support Equipment* or its equivalent revision or replacement.

6.4 Instrument/ Equipment Maintenance

The objectives of the Pace Analytical maintenance program are twofold: to establish a system of instrument care that maintains instrumentation and equipment at required levels of calibration and sensitivity, and to minimize loss of productivity due to repairs.

The Laboratory Operations Manager and department manager/supervisors are responsible for providing technical leadership to evaluate new equipment, solve equipment problems and coordinate instrument repair and maintenance. The analysts have a primary responsibility to perform routine maintenance.

To minimize downtime and interruption of analytical work, preventative maintenance is routinely performed on each analytical instrument. Up-to-date instructions on the use and maintenance of equipment are available to staff in the department where the equipment is used.

Department manager/supervisors are responsible for maintaining an adequate inventory of spare parts required to minimize equipment downtime. This inventory includes parts and supplies that are subject to frequent failure, have limited lifetimes, or cannot be obtained in a timely manner should a failure occur.

All major equipment and instrumentation items are uniquely identified to allow for traceability. Equipment/instrumentation are, unless otherwise stated, identified as a system and not as individual pieces. The laboratory maintains equipment records that include the following:

- The name of the equipment and its software
- The manufacturer's name, type, and serial number
- Approximate date received and date placed into service
- Current location in the laboratory
- Condition when received (new, used, etc.)
- Copy of any manufacturer's manuals or instructions

- Dates and results of calibrations and next scheduled calibration (if known)
- Details of past maintenance activities, both routine and non-routine
- Details of any damage, modification or major repairs

All instrument maintenance is documented in maintenance logbooks that are assigned to each particular instrument or system.

When maintenance is performed to repair an instrument problem, depending on the initial problem, demonstration of return to control may be satisfied by the successful analysis of a reagent blank or continuing calibration standard. The entry must include a summary of the results of that analysis and verification by the analyst that the instrument has been returned to an in-control status. In addition, each entry must include the initials of the analyst making the entry, the dates the maintenance actions were performed, and the date the entry was made in the maintenance logbook, if different from the date(s) of the maintenance.

Any equipment that has been subjected to overloading or mishandling, or that gives suspect results, or has been shown to be defective, is taken out of service and clearly identified. The equipment shall not be used to analyze customer samples until it has been repaired and shown to perform satisfactorily.

7.0 CONTROL OF DATA

Analytical results processing, verification and reporting are procedures employed that result in the delivery of defensible data. These processes include, but are not limited to, calculation of raw data into final concentration values, review of results for accuracy, evaluation of quality control criteria and assembly of technical reports for delivery to the data user.

All analytical data undergo a well-defined, well-documented multi-tier review process prior to being reported to the customer. This section describes procedures used by PASI for translating raw analytical data into accurate, final sample reports and PASI data storage policies.

7.1 Analytical Results Processing

When analytical, field, or product testing data is generated, it is either recorded in a bound laboratory logbook (e.g. Run log or Instrument log) or copies of computer-generated printouts are appropriately labeled and filed. These logbooks and other laboratory records are kept in accordance with each facility's Standard Operating Procedure for documentation storage and archival. If the lab chooses to minimize paper usage, these records can be kept as electronic records. In this case, the laboratory must ensure that there are sufficient redundant electronic copies so no data is lost due to unforeseen computer issues.

The primary analyst is responsible for initial data reduction and review. This includes confirming compliance with required methodology, verifying calculations, evaluating quality control data, noting discrepancies in logbooks and as footnotes or narratives, and uploading analytical results into the LIMS.

The primary analyst then compiles the initial data package for verification. This compilation must include sufficient documentation for data review. It may include standard calibrations, chromatograms, manual integration documentation, electronic printouts, chain-of-custody forms, and logbook copies.

Some agencies or customers require different levels of data reporting. For these special levels, the primary analyst may need to compile additional project information, such as initial calibration data or extensive spectral data, before the data package proceeds to the verification step.

7.2 Data Verification

Data verification is the process of examining data and accepting or rejecting it based on pre-defined criteria. This review step is designed to ensure that reported data are free from calculation and transcription errors, that quality control parameters are evaluated and that any discrepancies are properly documented.

Analysts performing the analysis and subsequent data reduction have primary responsibility for quality of the data produced. The primary analyst initiates the data verification process by reviewing and accepting the data, provided QC criteria have been met for the samples being reported. Data review checklists, either hardcopy or electronic, are used to document the data review process. The primary analyst is responsible for the initial input of the data into the LIMS.

The completed data package is then sent to a designated qualified reviewer (this cannot be the primary analyst). The following criteria have been established to qualify someone as a data reviewer. To perform secondary data reviewer, the reviewer must:

1. Have a current Demonstration of Capability (DOC) study on file and have an SOP acknowledgement form on file for the method/procedure being reviewed; or, ^{See Note}
2. Have a DOC on file for a similar method/technology (i.e. GC/MS) and have an SOP acknowledgement form on file for the method/procedure being reviewed; or, ^{See Note}
3. Supervise or manage a Department and have an SOP acknowledgment form on file for the method/procedure being reviewed; or,

4. Have significant background in the department/methods being reviewed through education or experience and have an SOP acknowledgment form on file for the method/procedure being reviewed.

Note: Secondary reviewer status must be approved personally by the Quality Manager or General Manager in the event that this person has no prior experience on the specific method or general technology (i.e. GC/MS).

This reviewer provides an independent technical assessment of the data package and technical review for accuracy according to methods employed and laboratory protocols. This assessment involves a quality control review for use of the proper methodology and detection limits, compliance to quality control protocol and criteria, presence and completeness of required deliverables, and accuracy of calculations and data quantitation. The reviewer also validates the data entered into the LIMS.

Once the data have been technically reviewed and approved, authorization for release of the data from the analytical section is indicated by initialing and dating the data review checklist or otherwise initialing and dating the data (or designating the review of data electronically). The Operations or Project Manager examines the report for method appropriateness, detection limits and QC acceptability. Any deviations from the referenced methods are checked for documentation and validity, and QC corrective actions are reviewed for successful resolution.

Prior to the release of the report, the Project Manager uses a program known as Data Checker to display warnings or errors. Warnings are items brought to the attention to the Project Manager (such as surrogate values outside of acceptance limits) so the Project Manager can verify that the report has been qualified/footnoted properly. Errors normally require some form of corrective action by lab personnel) such as compounds missing from a multi-analyte report, QC limits missing, etc.). Results of the Data Checker program are filed with each report folder.

7.3 Data Reporting

All data segments pertaining to a particular PASI project number are delivered to the Client Services Department (Project Manager) for assembly into the final report. All points mentioned during technical and QC reviews are included in a case narrative if there is potential for data to be impacted.

Final reports are prepared according to the level of reporting required by the customer and can be transmitted to the customer via hardcopy or electronic deliverable. A standard PASI final report consists of the following components:

1. A title which designates the report as "Final Report", "Laboratory Results", "Certificate of Results", etc.
2. Name and address of laboratory (or subcontracted laboratories, if used).
3. Phone number and name of laboratory contact where questions can be referred.
4. A unique number for the report (project number). The pages of the report shall be numbered and a total number of pages shall be indicated (usually in the cover letter).
5. Name and address of customer and name of project (if applicable).
6. Unique identification of samples analyzed (including customer sample numbers).
7. Identification of any sample that did not meet acceptable sampling requirements (from NELAC or other governing agency), such as improper sample containers, holding times missed, sample temperature, etc.
8. Date and time of collection of samples, date of sample receipt by the laboratory, dates of sample preparation and analysis, and times of sample preparation and analysis when the holding time for either is 72 hours or less.
9. Identification of the test methods used.
10. Identification of sampling procedures if sampling was conducted by the laboratory.
11. Deviations from, additions to, or exclusions from the test methods. These can include failed quality control parameters, deviations caused by the matrix of the sample, etc., and can be shown as a case narrative or as defined footnotes to the analytical data.
12. Identification of whether calculations were performed on a dry or wet-weight basis.
13. Reporting limits used.
14. Final results or measurements.

15. A signature and title of person accepting responsibility for the content of the report (can be an equivalent electronic identification) and date report was issued.
16. A statement clarifying that the results of the report relate only to the samples tested or to the samples as they were received by the laboratory.
17. If necessary, a statement indicating that the report must not be reproduced except in full, without the written approval of the laboratory.
18. Identification of all test results provided by a subcontracted laboratory or other outside source.
19. Identification of results obtained outside of quantitation levels.

Any changes made to a final report shall be designated as "Revised" or equivalent wording. The laboratory must keep sufficient archived records of all lab reports and revisions. For higher levels of data deliverables, a copy of all applicable raw data is sent to the customer along with a final report of results. When possible, the PASI facility will provide electronic data deliverables (EDD) as required by contracts or upon customer request.

Customer data that requires transmission by telephone, telex, facsimile or other electronic means undergoes appropriate steps to preserve confidentiality.

The following positions are the only approved signatories for PASI final reports:

- Senior General Manager
- General Manager
- Quality Manager
- Client Services Manager
- Project Manager
- Project Coordinator

7.4 Data Security

All data including electronic files, logbooks, extraction/digestion/distillation worksheets, calculations, project files and reports, and other information used to produce the technical report are maintained secured and retrievable by the PASI facility.

7.5 Data Archiving

All records compiled by PASI are maintained legible and retrievable and stored secured in a suitable environment to prevent loss, damage, or deterioration by fire, flood, vermin, theft, and/or environmental deterioration. Records are retained for a minimum of seven years unless superseded by federal, state, contractual, and/or accreditation requirements. These records may include, but are not limited to, customer data reports, calibration and maintenance of equipment, raw data from instrumentation, quality control documents, observations, calculations and logbooks. These records are retained in order to provide for possible historical reconstruction including sampling, receipt, preparation, analysis and personnel involved. NELAP-related records will be made readily available to accrediting authorities. Access to archived data is documented and controlled by the Quality Manager or a designated Data Archivist.

Records that are computer-generated have either a hard copy or electronic write-protected backup copy. Hardware and software necessary for the retrieval of electronic data is maintained with the applicable records. Archived electronic records are stored protected against electronic and/or magnetic sources.

In the event of a change in ownership, accountability or liability, reports of analyses performed pertaining to accreditation will be maintained by the acquiring entity for a minimum of five years. In the event of bankruptcy, laboratory reports and/or records will be transferred to the customer and/or the appropriate regulatory entity upon request.



7.6 Data Disposal

Data that has been archived for the facility's required storage time may be disposed of in a secure manner by shredding, returning to customer, or utilizing some other means that does not jeopardize data confidentiality. Records of data disposal will be archived for a minimum of seven years unless superseded by federal, contractual, and/or accreditation requirements.

8.0 QUALITY SYSTEM AUDITS AND REVIEWS

8.1 Internal Audits

8.1.1 Responsibilities

The Quality Manager is responsible for designing and/or conducting internal audits in accordance with a predetermined schedule and procedure. Since internal audits represent an independent assessment of laboratory functions, the auditor must be functionally independent from laboratory operations to ensure objectivity. The auditor must be trained, qualified and familiar enough with the objectives, principles, and procedures of laboratory operations to be able to perform a thorough and effective evaluation. The Quality Manager evaluates audit observations and verifies the completion of corrective actions. In addition, a periodic corporate audit will be conducted by the Director of Quality, Safety and Training and/or designee. The corporate audits will focus on the execution of the Quality System as outlined in this manual but may also include other quality programs applicable to each laboratory.

8.1.2 Scope and Frequency of Internal Audits

Internal systems audits are conducted yearly at a minimum. The scope of these audits includes evaluation of specific analytical departments or a specific quality-related system as applied throughout the laboratory.

Examples of system-wide elements that can be audited include:

- Quality Systems documents, such as Standard Operating Procedures, training documents, Quality Assurance Manual and all applicable addenda
- Personnel and training files.
- General laboratory safety protocols.
- Chemical handling practices, such as labeling of reagents, solutions, standards, and associated documentation.
- Documentation concerning equipment and instrumentation, calibration/maintenance records, operating manuals.
- Sample receipt and management practices.
- Analytical documentation, including any discrepancies and corrective actions.
- General procedures for data security, review, documentation, reporting and archiving.
- Data integrity issues such as proper manual integrations.

When the operations of a specific department are evaluated, a number of additional functions are reviewed including:

- Detection limit studies
- Internal chain-of-custody documentation
- Documentation of standard preparations
- Quality Control limits and Control charts

Certain projects may require an internal audit to ensure laboratory conformance to site work plans, sampling and analysis plans, QAPPs, etc.

A representative number of data audits are completed annually. The report format of any discrepancy is similar to that of other internal audits.

The laboratory, as part of their overall internal audit program, ensures that a review is conducted with respect to any evidence of inappropriate actions or vulnerabilities related to data integrity. Discovery and reporting of potential data integrity issues are handled in a confidential manner until such time as a follow up evaluation, full investigation, or other appropriate actions are completed and the issues clarified. All investigations that result in findings of inappropriate activity are fully documented, including the source of the problem, the samples and customers affected, the impact on the data, the corrective actions taken by the lab and which final reports had to be re-issued. Customers are notified within 30 days when the investigation indicates analytical results are affected.

8.1.3 Internal Audit Reports and Corrective Action Plans

Additional information can be found in SOP S-IN-Q-154 **Audits and Inspections** or its equivalent revision or replacement.

A full description of the audit, including the identification of the operation audited, the date(s) on which the audit was conducted, the specific systems examined, and the observations noted are summarized in an internal audit report. Although other personnel may assist with the performance of the audit, the Quality Manager writes and issues the internal audit report identifying which audit observations are deficiencies that require corrective action.

When audit findings cast doubt on the effectiveness of the operations or on the correctness of validity of the laboratory's environmental test results, the laboratory will take timely corrective action and notify the customer in writing within 3 business days, if investigations show that the laboratory results may have been affected.

Once completed, the internal audit report is issued jointly to the Laboratory General Manager and the manager(s)/supervisor(s) of the audited operation at a minimum. The responsible manager(s)/supervisor(s) responds within 14 days with a proposed plan to correct all of the deficiencies cited in the audit report. The Quality Manager may grant additional time for responses to large or complex deficiencies (not to exceed 30 days). Each response must include timetables for completion of all proposed corrective actions.

The Quality Manager reviews the audit responses. If the response is accepted, the Quality Manager uses the action plan and timetable as a guideline for verifying completion of the corrective action(s). If the Quality Manager determines that the audit response does not adequately address the correction of cited deficiencies, the response will be returned for modification.

To complete the audit process, the Quality Manager performs a re-examination of the areas where deficiencies were found to verify that all proposed corrective actions have been implemented. An audit deficiency is considered closed once implementation of the necessary corrective action has been verified. If corrective action cannot be verified, the associated deficiency remains open until that action is completed.

8.2 External Audits

PASI laboratories are audited regularly by regulatory agencies to maintain laboratory certifications, and by customers to maintain appropriate specific protocols.

Audit teams external to the company review the laboratory to assess the existence of systems and degree of technical expertise. The Quality Manager and other QA staff host the audit team and assist in facilitation of the audit process. Generally, the auditors will prepare a formalized audit report listing deficiencies observed and follow-up requirements for the laboratory. In some cases, items of concern are discussed during a debriefing convened at the end of the on-site review process.

The laboratory staff and supervisors develop corrective action plans to address any deficiencies with the guidance of the Quality Manager. The Laboratory General Manager provides the necessary resources for staff to develop and implement the corrective action plans. The Quality Manager collates this information and provides a written report to the audit team. The report contains the corrective action plan and expected completion dates for each element of the plan. The Quality Manager follows-up with the laboratory staff to ensure corrective actions are implemented.

8.3 Quarterly Quality Reports

The Quality Manager is responsible for preparing a quarterly report to management summarizing the effectiveness of the laboratory Quality Systems. This status report will include:

- Results of internal systems or performance audits
- Corrective action activities
- Discussion of QA issues raised by customers
- Results of third party or external audits
- Status of laboratory certifications
- Proficiency Testing Study Results
- Results of internal laboratory review activities
- Summary of holding time violations
- Method detection limit study status
- Training activity summary
- SOP revision summary
- 3P Implementation summary (internal program)
- Other significant Quality System items

The Corporate Director of Quality, Safety & Technology utilizes the information from each laboratory to make decisions impacting the Quality Systems of the company as a whole. Each General Manager utilizes the quarterly report information to make decisions impacting Quality Systems and operational systems at a local level.

Additional information can be found in SOP S-ALL-Q-014 **Quality System Review** or its equivalent revision or replacement.

8.4 Annual Managerial Review

A managerial review of Quality Systems is performed on an annual basis at a minimum. This allows for assessing program effectiveness and introducing changes and/or improvements.

The managerial review must include the following topics of discussion:

- Policy and procedure suitability
- Manager/Supervisor reports
- Internal audit results
- Corrective and preventative actions
- External assessment results
- Proficiency testing studies
- Sample capacity and scope of work changes
- Customer feedback, including complaints

This managerial review must be documented for future reference by the Quality Manager and copies of the report are distributed to laboratory staff. The laboratory shall ensure that any actions identified during the review are carried out within an appropriate and agreed timescale.



8.5 Customer Service Reviews

As part of the annual managerial review listed previously, the sales staff is responsible for reporting on customer feedback, including complaints. The acquisition of this information is completed by performing surveys.

The sales staff continually receives customer feedback, both positive and negative, and reports this feedback to the lab management in order for them to evaluate and improve their management system, testing activities and customer service.

In addition, the labs must be willing to cooperate with customers or their representatives to clarify customer requests and to monitor the lab's performance in relation to the work being performed for the customers.

9.0 CORRECTIVE ACTION

Additional information can be found in SOP *S-ALL-Q-012 Corrective Action/Preventive Action Process* or its equivalent revision or replacement.

During the process of sample handling, preparation and analysis, certain occurrences may warrant the necessity of corrective actions. These occurrences may take the form of analyst errors, deficiencies in quality control, method deviations, or other unusual circumstances. The Quality System of PASI provides systematic procedures for documentation, monitoring and completion of corrective actions. This can be done using PASI's LabTrack system that lists among other things, the deficiency by issue number, the deficiency source, responsible party, root cause, resolution, due date, and date resolved.

9.1 Corrective Action Documentation

The following items are examples of laboratory deviations or non-conformances that warrant some form of documented corrective action:

- Quality Control data outside of acceptance criteria
- Sample Acceptance Policy deviations
- Missed holding times
- Instrument failures (including calibration failure)
- Sample preparation or analysis errors
- Sample contamination
- Errors in customer reports
- Audit findings (internal and external)
- Proficiency Testing (PT) sample failures
- Customer complaints or inquiries

Documentation of corrective actions may be in the form of a comment or footnote on the final report that explains the deficiency (e.g. matrix spike recoveries outside of acceptance criteria) or it may be a more formal documentation (either paper system or computerized spreadsheet). This depends on the extent of the deficiency, the impact on the data, and the method or customer requirements for documentation.

The person who discovers the deficiency or non-conformance initiates the corrective action documentation on the Non-Conformance Corrective/ Preventative Action report and/or LabTrack. The documentation must include the affected projects and sample numbers, the name of the applicable Project Manager, the customer name and the sample matrix involved. The person initiating the corrective action documentation must also list the known causes of the deficiency or non-conformance as well as any corrective/preventative actions that they have taken. Preventive actions must be taken in order to prevent or minimize the occurrence of the situation.

In the event that the laboratory is unable to determine the cause, laboratory personnel and management staff will start a root cause analysis by going through an investigative process. During this process, the following general steps must be taken into account: defining the non-conformance problem, assigning responsibilities, determining if the condition is significant, and investigating the root cause of the non-conformance problem. General non-conformance investigative techniques follow the path of the sample through the process looking at each individual step in detail. The root cause must be documented within Lab Track or on the Corrective/Preventative Action Report.

After all the documentation is completed, the routing of the Corrective/Preventative Action Report and /or Lab Track will continue from the person initiating the corrective action, to their immediate supervisor or the Project Manager and finally to the Quality Manager, who is responsible for final review and signoff of all formal corrective/preventative actions.

9.2 Corrective Action Completion

9.2.1 Quality Control outside of acceptance criteria

The analyst that is generating or validating Analytical data is responsible for checking the results against established acceptance criteria (quality control limits). The analyst must immediately address any deficiencies discovered. Method blank, LCS or matrix spike failures are evaluated against method, program, and customer requirements and appropriate footnotes are entered into the LIMS system. Some deficiencies may be caused by matrix interferences. Where possible, matrix interferences are confirmed by re-analysis.

Quality control deficiencies must be made known to the customer on the final report for their review of the data for usability. If appropriate, the supervisor is alerted to the QC failure and if necessary a formal corrective action can be initiated. This may involve the input of the Quality Manager or the General Manager.

The department supervisor and/or Operations Manager are responsible for evaluating the source of the deficiency and for returning the analytical system to control. This may involve instrument maintenance, analytical standard or reagent evaluation, or an internal audit of the analytical procedure.

9.2.2 Sample Acceptance Policy deviations

Any deviation from the Sample Acceptance Policy listed in this Manual must be documented on the Chain-of-Custody or other applicable form by the sample receiving personnel or by the Project Manager. Analysts or supervisors that discover such deviations must contact the sample receiving personnel or appropriate Project Manager so they can initiate the proper documentation and customer contact. If a more formalized corrective action must be documented, the Quality Manager is made aware of the situation.

The customer is notified of these deviations as soon as possible so they can make decisions on whether to continue with the sample analysis or re-sample. Copies of this documentation are included in the project file.

9.2.3 Missed holding times

In the event that a holding time requirement has been missed, the analyst or supervisor must complete a formal corrective action form. The Project Manager and the Quality Manager must be made aware of these hold time exceedances.

The Project Manager must contact the customer for appropriate decisions to be made with the resolution documented and included in the customer project file. The Quality Manager includes a list of all missed holding times in their Quarterly Report to the corporate office.

9.2.4 Instrument Failures

In the event of an instrument failure that either causes the necessity for re-analysis or questions the validity of generated results, a formal corrective action must be initiated. The analyst and supervisor evaluate any completed data for validity and usability. They are also responsible for returning the instrument to valid operating condition and for documenting that the system is in control (e.g. acceptable calibration verification).

9.2.5 Sample Preparation or Analysis errors

When there is an error in the preparation or analysis of samples, the analyst evaluates the impact on the usability of the analytical data with the assistance of the supervisor or manager. The affected samples will be re-processed or re-analyzed under acceptable conditions. In the event that no additional sample is available for re-analysis, the customer must be contacted for their decision on how to proceed. Documentation may take the form of footnotes or a formal corrective action form.

9.2.6 Errors in customer reports

When an error on the customer report is discovered, the Project Manager is responsible for initiating a formal corrective action form that describes the failure (e.g. incorrect analysis reported, reporting units are incorrect, reporting limits do not meet objectives). The Project Manager is also responsible for revising the final report if necessary and submitting it to the customer.

9.2.7 Audit findings

The Quality Manager is responsible for documenting all audit findings and their corrective actions. This documentation must include the initial finding, the persons responsible for the corrective action, the due date for reporting back to the auditing body, the root cause of the issue, and the corrective action taken to resolve the findings. The Quality Manager is also responsible for providing any back-up documentation used to prove that a corrective action has been completed.

9.2.8 Proficiency Testing failures

Any PT result returned to the Quality Manager as “not acceptable” requires an investigation and applicable corrective actions. The operational staff is made aware of the PT failures and they are responsible for reviewing the applicable raw data and calibrations and list possible causes for error. The Quality Manager reviews their findings and initiates another external PT sample or an internal PT sample to try and correct the previous failure. Replacement PT results must be monitored by the Quality Manager and reported to the applicable regulatory authorities.

9.2.9 Customer Complaints

Project Managers are responsible for issuing corrective action forms for customer complaints. As with other corrective actions, the possible causes of the problem are listed and the form is passed to the appropriate analyst or supervisor. After the corrective actions have been listed, the Project Manager reviews the corrective action to determine if the customer needs or concerns are being addressed.

9.3. Preventive Action Documentation

Pace laboratories can take advantage of several available information sources in order to identify needed improvements in all of their systems (technical, managerial, quality, etc.). These sources may include:

- Management Continuous Improvement Plan (CIP) metrics which are used by all production departments within Pace. When groups compare performance across the company, ways to improve systems are discovered. These improvements can be made within a department or lab-wide.
- Annual managerial reviews- part of this NELAC-required review is to look at all processes and procedures used by the lab over the past year and to determine ways to improve these processes in the future.
- Quality systems reviews- any frequent checks of quality systems (monthly logbook reviews, etc.) can uncover issues that can be corrected or adjusted before they become a larger issue.

When improvement opportunities are identified or if preventive action is required, the lab can develop, implement, and monitor preventive action plans.

10.0 GLOSSARY

3P Program	The Pace Analytical continuous improvement program that focuses on Process, Productivity and Performance. Best Practices are identified that can be used by all PASI labs.
Accuracy	The agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations; a data quality indicator.
Aliquot	A portion of a sample taken for analysis.
Analyte	The specific chemical species or parameter an analysis seeks to determine.
Batch	Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A preparation batch is composed of one to 20 environmental samples of the same NELAC-defined matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours. An analytical batch is composed of prepared environmental samples (extracts, digestates or concentrates) that are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.
Blank	A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results.
Blind Sample	A sample for submitted for analysis with a composition known to the submitter. The analyst/laboratory may know the identity of the sample but not its composition. It is used to test analyst or laboratory proficiency in the execution of the measurement process.
Calibration	To determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard must bracket the range of planned or expected sample measurements.
Calibration Curve	The graphic representation of known values, such as concentrations for a series of calibration standards and their instrument response.
Chain-of-Custody (COC)	A record that documents the possession of samples from the time of collection to receipt in the laboratory. This record generally includes the number and type of containers, mode of collection, collector, time of collection, preservation, and requested analyses.
Confirmation	Verification of the identity of a component through the use of an alternate scientific approach from the original method. These may include, but are not limited to: <ul style="list-style-type: none"> • second-column confirmation • alternate wavelength • derivatization derivative • mass spectral interpretation • additional cleanup procedures
Contract Required Detection Limit (CRDL)	Detection limit that is required for EPA Contract Laboratory Program (CLP) contracts.
Contract Required Quantitation Limit (CRQL)	Quantitation limit (reporting limit) that is required for EPA Contract Laboratory Program (CLP) contracts.
Comparability	An assessment of the confidence with which one data set can be compared to another. Comparable data are produced through the use of standardized procedures and techniques.

Completeness	<p>The percent of valid data obtained from a measurement system compared to the amount of valid data expected under normal conditions. The equation for completeness is:</p> $\% \text{ Completeness} = (\text{Valid Data Points} / \text{Expected Data Points}) * 100$
Calibration Verification	The process of verifying a calibration by analysis of standards and comparing the results with the known amount.
Control Chart	A graphic representation of a series of test results, together with limits within which results are expected when the system is in a state of statistical control (see definition for Control Limit)
Control Limit	A range within which specified measurement results must fall to verify that the analytical system is in control. Control limit exceedances may require corrective action or require investigation and flagging of nonconforming data.
Corrective Action	The action taken to eliminate the causes of a nonconformity, defect, or other undesirable situation in order to prevent recurrence.
Corrective and Preventative Action (CAPA)	The primary management tools for bringing improvements to the quality system, to the management of the quality system's collective processes, and to the products or services delivered which are an output of established systems and processes.
Data Quality Objective (DOQ)	Systematic strategic planning tool based on the scientific method that identifies and defines the type, quality, and quantity of data needed to satisfy a specified use or end user.
Data Reduction	The process of transforming raw data by arithmetic or statistical calculations, standard curves, concentration factors, etc., and collation into a more usable form.
Demonstration of Capability	A procedure to establish the ability of the analyst to generate acceptable accuracy.
Detection Limit (DL)	General term for the lowest concentration or amount of the target analyte that can be identified, measured and reported with confidence that the analyte concentration is not a false positive value. See definitions for Method Detection Limit and Limit of Detection.
Document Control (Management)	Procedures to ensure that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and controlled (managed) to ensure use of the correct version at the location where the prescribed activity is performed.
Dry Weight	The weight after drying in an oven at a specified temperature.
Duplicate or Replicate Analysis	The identically performed measurement on two or more sub-samples of the same sample within a short interval of time
Environmental Sample	<p>A representative sample of any material (aqueous, non-aqueous, or multimedia) collected from any source for which determination of composition or contamination is requested or required. Environmental samples can generally be classified as follows:</p> <ul style="list-style-type: none"> • Non Potable Water (Includes surface water, ground water, effluents, water treatment chemicals, and TCLP leachates or other extracts) • Drinking Water - Delivered (treated or untreated) water designated as potable water • Water/Wastewater - Raw source waters for public drinking water supplies, ground waters, municipal influents/effluents, and industrial influents/effluents • Sludge - Municipal sludges and industrial sludges. • Soil - Predominately inorganic matter ranging in classification from sands to clays. • Waste - Aqueous and non-aqueous liquid wastes, chemical solids, and industrial liquid and solid wastes
Equipment Blank	A sample of analyte-free media used to rinse common sampling equipment to check effectiveness of decontamination procedures.
Field Blank	A blank sample prepared in the field by filling a clean container with reagent water and appropriate preservative, if any, for the specific sampling activity being undertaken.

Field Measurement	Determination of physical, biological, or radiological properties, or chemical constituents that are measured on-site, close in time and space to the matrices being sampled/measured, following accepted test methods. This testing is performed in the field outside of a fixed-laboratory or outside of an enclosed structure that meets the requirements of a mobile laboratory.
Holding Time	The maximum time that samples may be held prior to preparation and/or analysis as defined by the method.
Homogeneity	The degree to which a property or substance is uniformly distributed throughout a sample.
Initial Calibration (ICAL)	The process of analyzing standards, prepared at specified concentrations, to define the quantitative response relationship of the instrument to the analytes of interest. Initial calibration is performed whenever the results of a calibration verification standard do not conform to the requirements of the method in use or at a frequency specified in the method.
Internal Standards	A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method.
Intermediate Standard Solution	Reference solutions prepared by dilution of the stock solutions with an appropriate solvent.
Laboratory Control Sample (LCS)	A blank sample matrix, free from the analytes of interest, spiked with known amounts of analytes or a material containing known amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. Sometimes referred to as Laboratory Fortified Blank, Spiked Blank or QC Check Sample.
Limit of Detection (LOD)	An estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte and matrix specific and may be laboratory-dependent.
Limit of Quantitation (LOQ)	The minimum levels, concentrations or quantities of a target variable (e.g. target analyte) that can be reported with a specified degree of confidence
Laboratory Information Management System (LIMS)	A computer system that is used to maintain all sample information from sample receipt, through preparation and analysis and including sample report generation.
Learning Management System (LMS)	A web-based database used by the laboratories to track and document training activities. The system is administered by the corporate training department and each lab's learn centers are maintained by a local administrator.
Lot	A quantity of bulk material of similar composition processed or manufactured at the same time.

Matrix	<p>The component or substrate that contains the analyte of interest. For purposes of batch and QC requirement determinations, the following matrix distinctions are used:</p> <ul style="list-style-type: none"> • Aqueous or Non-Potable Water: any aqueous sample excluded from the definition of Drinking Water matrix or Saline/Estuarine source. Includes surface water, groundwater, effluents, and TCLP or other extracts. • Drinking Water: any aqueous sample that has been designated a potable or potentially potable water source. • Saline/Estuarine: any aqueous sample from an ocean or estuary, or other saltwater source. • Non-aqueous liquid: any organic liquid with <15% settleable solids. • Biological Tissue: any sample of a biological origin such as fish tissue, shellfish or plant material. Such sample can be grouped according to origin. • Solid: includes soils, sediments, sludges, and other matrices with >15% settleable solids. • Chemical Waste: a product or by-product or an industrial process that results in a matrix not previously defined • Air and Emissions: whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas vapor that are collected with a sorbent tube, impinger solution, filter, or other device.
Matrix Spike (MS)	A sample prepared by adding a known quantity of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used to determine the effect of the matrix on a method's recovery efficiency. (sometimes referred to as Spiked Sample or Fortified Sample)
Matrix Spike Duplicate (MSD)	A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of precision of the recovery of each analyte. (sometimes referred to as Spiked Sample Duplicate or Fortified Sample Duplicate)
Method Blank	A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures; and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.
Method Detection Limit (MDL)	One way to establish a Limit of Detection (LOD); defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.
Performance Based Measurement System (PBMS)	An analytical system wherein the data quality needs, mandates or limitations of a program or project are specified and serve as criteria for selecting appropriate test methods to meet those needs in a cost-effective manner.
Precision	The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.
Preservation	Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.
Proficiency Testing	A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source.
Protocol	A detailed written procedure for field and/or laboratory operation that must be strictly followed.
Quality Assurance Project Plan (QAPP)	A formal document describing the detailed quality control procedures required by a specific project.
Quality Assurance (QA)	An integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence.

Quality Control (QC)	The overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users.
Quality Control Sample	A sample used to assess the performance of all or a portion of the measurement system. QC samples may be Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking.
Quality Assurance Manual	A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users.
Quality System	A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC.
Random Error	The EPA has established that there is a 5% probability that the results obtained for any one analyte will exceed the control limits established for the test due to random error. As the number of compounds measured increases in a given sample, the probability for statistical error also increases.
Raw Data	Any original factual information from a measurement activity or study recorded in a laboratory notebook, worksheets, records, memoranda, notes, or exact copies thereof that are necessary for the reconstruction and evaluation of the report of the activity or study. Raw data may include photography, microfilm or microfiche copies, computer printouts, magnetic media, including dictated observations, and recorded data from automated instruments. If exact copies of raw data have been prepared (e.g. tapes which have been transcribed verbatim, dated and verified accurate by signature), the exact copy or exact transcript may be submitted.
Reagent Grade	Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents that conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.
Reference Standard	A standard, generally of the highest metrological quality available at a given location, from which measurements made at that location are derived.
Reporting Limit (RL)	The level at which method, permit, regulatory and customer-specific objectives are met. The reporting limit may never be lower than the Limit of Detection (i.e. statistically determined MDL). Reporting limits are corrected for sample amounts, including the dry weight of solids, unless otherwise specified. There must be a sufficient buffer between the Reporting Limit and the MDL.
Representativeness	A quality element related to the ability to collect a sample reflecting the characteristics of the part of the environment to be assessed. Sample representativeness is dependent on the sampling techniques specified in the project work plan.
Sample Delivery Group (SDG)	A unit within a single project that is used to identify a group of samples for delivery. An SDG is a group of 20 or fewer field samples within a project, received over a period of up to 14 calendar days. Data from all samples in an SDG are reported concurrently.
Sample Tracking	Procedures employed to record the possession of the samples from the time of sampling until analysis, reporting and archiving. These procedures include the use of a Chain-of-Custody Form that documents the collection, transport, and receipt of compliance samples to the laboratory. In addition, access to the laboratory is limited and controlled to protect the integrity of the samples.
Sensitivity	The capability of a method or instrument to discriminate between measurement responses representing different levels (concentrations) of a variable of interest.
Standard	A substance or material with properties known with sufficient accuracy to permit its use to evaluate the same property in a sample.

Standard Blank	A calibration standard consisting of the same solvent/reagent matrix used to prepare the calibration standards without the analytes. It is used to construct the calibration curve by establishing instrument background.
Standard Operating Procedure (SOP)	A written document which details the method of an operation, analysis, or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive tasks
Stock Standard	A concentrated reference solution containing one or more analytes prepared in the laboratory using an assayed reference compound or purchased from a reputable commercial source.
Surrogate	A substance with properties that mimic the analyte of interest. It is unlikely to be found in environmental samples and is added to them for quality control purposes.
Systems Audit	An on-site inspection or assessment of a laboratory's quality system.
Traceability	The property of a material or measurement result defining its relationship to recognized international or national standards through an unbroken chain of comparisons.
Training Document	A training resource that provides detailed instructions to execute a specific method or job function.
Trip Blank	This blank sample is used to detect sample contamination from the container and preservative during transport and storage of the sample. A cleaned sample container is filled with laboratory reagent water and the blank is stored, shipped, and analyzed with its associated samples.
Uncertainty Measurement	The parameter associated with the result of a measurement that characterized the dispersion of the values that could be reasonably attributed to the measurand (i.e. the concentration of an analyte).

11.0 REFERENCES

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- "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846.
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- "Standard Methods for the Examination of Water and Wastewater." Current Edition APHA-AWWA-WPCF
- "Annual Book of ASTM Standards", Section 4: Construction, Volume 04.04: Soil and Rock; Building Stones, American Society of Testing and Materials.
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- "NIOSH Manual of Analytical Methods", Third Edition, 1984, U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health.
- "Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water", U.S. EPA, Environmental Monitoring and Support Laboratory – Cincinnati (September 1986).
- Quality Assurance of Chemical Measurements, Taylor, John K.; Lewis Publishers, Inc. 1987
- Methods for Non-conventional Pesticides Chemicals Analysis of Industrial and Municipal Wastewater, Test Methods, EPA-440/1-83/079C
- Environmental Measurements Laboratory (EML) Procedures Manual, HASL-300, US DOE, February, 1992.
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- Requirements for Quality Control of Analytical Data for the Environmental Restoration Program, Martin Marietta, ES/ER/TM-16, December, 1992.
- Quality Assurance Manual for Industrial Hygiene Chemistry, AIHA, 1988
- National Environmental Laboratory Accreditation Conference, Constitution, Bylaws, and Standards. Most recent
- ISO/IEC 17025:2005, General requirements for the competence of testing and calibration laboratories.

12.0 REVISIONS

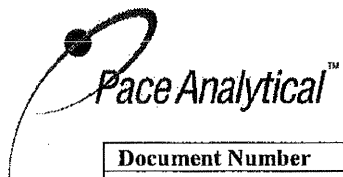
The PASI Corporate Quality and Safety Manager files both a paper copy and electronic version of a Microsoft Word document with tracked changes detailing all revisions made to the previous version of the Quality Assurance Manual. This document is available upon request. All revisions are summarized in the table below.

Document Number	Reason for Change	Date
Quality Assurance Manual Revision 10.0	<p>Throughout the document, Pace was replaced with PASI or in some cases with Pace Analytical. Also, corrections were made to wording, grammar, spelling, and formatting.</p> <p>SECTION 1:</p> <ul style="list-style-type: none"> Updated the PASI mission statement Deleted Financial Responsibility, Drug-Free Workplace, Non-Harassment, Proper and Professional Conduct, Protection of Property, and Communication sections. Added Assistant General Manager/ Operations Manager, Technical Director, Administrative Business Manager, Project Manager, Project Coordinator, Field Analyst, Laboratory Technician & Field Technician job descriptions Added detailed Chain of Command to Laboratory Organization section Updated the Training and Orientation section to reflect current practices Deleted a portion of the Laboratory Safety section and added a reference to the Safety Manual and Chemical Hygiene Plan. <p>SECTION 2:</p> <ul style="list-style-type: none"> Switched the order of Chain of Custody and Sample Acceptance Policy sections Added details of project review documentation to Project Initiation section Added steps to sample log in <p>SECTION 3:</p> <ul style="list-style-type: none"> Deleted reference to local addenda for companywide SOPs Rearranged sentences Added "PASI will not be liable if the customer chooses not to follow PASI recommendations" to the Regulatory and Method Compliance section. <p>SECTION 4:</p> <ul style="list-style-type: none"> Added details to the documentation of review or investigation of possible data integrity. Corrected wording in Method Blank section Deleted from LCS/LCSD section an out-of-control statement that said affected samples associated with a failing LCS must be re-analyzed <p>SECTION 5:</p> <ul style="list-style-type: none"> Added "Electronic documents must be readily accessible to all facility employees" to Documents Management section Updated the Standard Operating Procedure section to describe the new PASI corporate SOP Templates and distribution. <p>SECTION 6:</p> <ul style="list-style-type: none"> Re-organized & re-named sections Updated the interpretation of the Calibration Verification policy Added clarification to the definition of the Second Source Standard Revised Single Point Calibration procedure to address NELAC requirement Incorporated Spare Parts into Instrument/ Equipment Maintenance <p>SECTION 7:</p>	20Jun2006

Document Number	Reason for Change	Date
	<ul style="list-style-type: none"> Updated Analytical Results Processing section to clarify data documentation policy. Deleted "All data that are manually entered into the LIMS is reviewed at a rate of 100%" and deleted the use of checklists statement from Data Verification section Integrated paragraphs for better flow Deleted item # 15, "If required, a statement of the estimated uncertainty of the test results." from the Data Reporting section Added Data Security section to describe PASI data security practices Added fire, flood, and vermin protection requirement to Data Archiving section Added statement to Data Archiving section describing that NELAP related records are available to accrediting authorities. Added Data Disposal section <p>SECTION 8:</p> <ul style="list-style-type: none"> Deleted first paragraph stating that Pace labs are subject to internal and external audits and reviews. Added description of PASI internal audit program and investigations Added requirement that corrective action be taken and customer notified within 3 days if audit findings show that test results may have been affected Updated requirement for manager(s)/supervisor(s) to respond to audit findings with a plan to correct all deficiencies within 14 days. Statement included that allows Quality Manager to grant additional time for response. Added to Annual Managerial Review section that "The laboratory shall ensure that any actions identified during the review are carried out within an appropriate and agreed timescale." <p>SECTION 9:</p> <ul style="list-style-type: none"> Added documentation requirement for reporting discovery of deficiency or non-conformance, must be documented "on the Non-Conformance Corrective/ Preventative Action report and/or QA Trak." Added "Preventative actions must be taken in order to prevent or minimize the occurrence of the situation." Added a paragraph to describe the new PASI Root Cause Analysis procedure. <p>SECTION 10:</p> <ul style="list-style-type: none"> Added the following definitions: Contract Required Detection Limit (CRDL), Contract Required Quantitation Limit (CRQL), Corrective and Preventative Action (CAPA), Non Potable Water (to Environmental Sample definition), Intermediate Standard Solution, Quality Control Sample, Stock Standard, Uncertainty Measurement, Working Standard Solution, <p>SECTION 11:</p> <ul style="list-style-type: none"> Added ISO/IEC 17025:2005 reference <p>Appendix:</p> <ul style="list-style-type: none"> Added Appendix I: Quality Control Calculations 	
Quality Assurance Manual Revision 11.0	<p>Overall conversion to template format. Removed all references to Addenda. Changes required based on conversion are not explicitly noted unless change represents a significant policy change.</p> <p>SECTION 1:</p> <ul style="list-style-type: none"> Add comment to address continuous improvement to quality system. Changed statement of purpose in Section header to "Mission Statement". Added requirements for appointment when Technical Director absent. 	17Sep2007

Document Number	Reason for Change	Date
	<ul style="list-style-type: none"> Added requirements for notification to AA's and updates to organizational charts when management changes. Added Client Services Manager job description. <p>SECTION 2:</p> <ul style="list-style-type: none"> Changed temperature requirements to "Not Frozen but $\leq 6^{\circ}\text{C}$". Added flexible section concerning default sampling time in absence of customer-specified time. Added flexible section to address sample and container identification by the LIMS. Changed sample retention requirement to 45 days from receipt of samples. Added comment allowing for storage outside of temperature controlled conditions. <p>SECTION 3:</p> <ul style="list-style-type: none"> Inserted allowance for use of older methods. Changed references to work processing and training documents to allow for use of LMS and other types of training media. Inserted allowance for alternative DOCs where spiking not possible. <p>SECTION 4:</p> <ul style="list-style-type: none"> Inserted reference to Anonymous Message line. Inserted reference to the use of default control limits. Inserted allowance for release of data without corrective action for obvious matrix interferences. Inserted reference to the treatment of internal standards. Inserted allowance for use of MDL annual MDL verification in lieu of full 40 CFR Part 136 annual MDL studies. Inserted general procedure for LOQ verification <p>SECTION 5:</p> <ul style="list-style-type: none"> Added general process for approval and use of QAM template. Removed specific reference of Work Process Manuals. Left flexible section to include all other controlled documentation. <p>SECTION 6:</p> <ul style="list-style-type: none"> No changes noted. <p>SECTION 7:</p> <ul style="list-style-type: none"> Added qualifications for secondary reviewers. <p>SECTION 8:</p> <ul style="list-style-type: none"> Changed frequency listing for Corporate Audits. <p>SECTION 9:</p> <ul style="list-style-type: none"> Changed references from QA Track to Lab Track – left flexible to accommodate information still in QA Track. <p>SECTION 10:</p> <ul style="list-style-type: none"> No changes noted. <p>SECTION 11:</p> <ul style="list-style-type: none"> No changes noted. <p>ATTACHMENTS:</p> <ul style="list-style-type: none"> Standardized format for Attachments. 	
Quality Assurance Manual Revision 12.0	<p>General: replaced the word 'client' with 'customer', where applicable.</p> <p>SECTION 1:</p> <ul style="list-style-type: none"> Section 1.6.4: added language for clarity 	13Nov2008

Document Number	Reason for Change	Date
	<ul style="list-style-type: none"> Added new section 1.8.1; responsibilities of Senior General Managers. Section 1.8.3: added reference to LMS. Added new section 1.8.17: responsibilities of Waste Coordinators. Section 1.9, last paragraph: changed 'annually' to 'periodically'. Next to last paragraph- added reference to LMS. <p>SECTION 2:</p> <ul style="list-style-type: none"> Incorporated optional language into section 2.1 for laboratories with field services staff supervised by the laboratory Added new section 2.2 entitled Field Services. Section 2.3: added reference to the new Review of Analytical Requests SOP. Changed optional text in 2.6 to explain how EpicPro assigns unique ID # to projects and samples including the unique container ID Section 2.7.2: changed freezer temp requirement to match SOP. <p>SECTION 3:</p> <ul style="list-style-type: none"> Section 3.4: Included optional language for performing IDOCs for tests not amenable to spiking using the "4 replicate" approach. <p>SECTION 4:</p> <ul style="list-style-type: none"> Section 4.1: expanded language to allow electronic signature and storing of integrity training documentation within the LMS Section 4.30: clarified that control limits can be method specific or laboratory derived. Removed +/-4x SD criteria. Section 4.10: revised and added language regarding LOD studies, initial verification and annual verification, where applicable. Section 4.11: changed PRL to RL. Section 4.12: Clarified 95% CI as +/-2x SD. Section 4.13: added editable line regarding PT study information. Changed wording to say approved PT providers are utilized Section 4.14: added sentence regarding rounding rules listed applying only to LIMS. <p>SECTION 5:</p> <ul style="list-style-type: none"> Section 5.1, last bullet point: changed language to reflect that SOPs must be locked from printing if controlled electronically. <p>SECTION 6:</p> <ul style="list-style-type: none"> Section 6.3.1: adjusted language about classes of weights potentially used. Section 6.3.3: removed customer-specific requirement to re-calibrate every four hours but added space for this to be added back in where applicable. Added reference to Attachment III in the introductory paragraph to this section. <p>SECTION 7:</p> <ul style="list-style-type: none"> Sections 7.1-7.3: added language for those labs that are minimizing or eliminating the need for paper copies. Section 7.2: clarified language in numbered items so that it does not appear that all 4 criteria must be applicable at one time. Section 7.3: added list of approved signatories for final reports. Removed inference that final report includes raw data. Sections 7.5 and 7.6: Changed length of time records are retained from 5 years to 7 years. <p>SECTION 8:</p> <ul style="list-style-type: none"> Section 8.1.2, last paragraph: revised language regarding data integrity issues and added a timeframe to notify customers of affected data. Added section 8.5 "Customer Service Reviews"- ISO requirement 	



Document Number	Reason for Change	Date
	<p>SECTION 9:</p> <ul style="list-style-type: none">Added new section 9.3 regarding Preventive Action. <p>SECTION 10:</p> <ul style="list-style-type: none">No revisions. <p>SECTION 11:</p> <ul style="list-style-type: none">No revisions. <p>Attachments:</p> <ul style="list-style-type: none">Attachment IIb: updated corporate org chartAttachment III: updated equipment listAttachment V: updated SOP listAttachment VI: updated certification listAttachment VIII: revised to match the current Analytical Guides.	

ATTACHMENT I

Quality Control Calculations

PERCENT RECOVERY (%REC)

$$\%REC = \frac{(MSConc - SampleConc)}{TrueValue} * 100$$

NOTE: The SampleConc is zero (0) for the LCS and Surrogate Calculations

PERCENT DIFFERENCE (%D)

$$\%D = \frac{MeasuredValue - TrueValue}{TrueValue} * 100$$

where:

TrueValue = Amount spiked (can also be the \overline{CF} or \overline{RF} of the ICAL Standards)

Measured Value = Amount measured (can also be the CF or RF of the CCV)

PERCENT DRIFT

$$\%Drift = \frac{CalculatedConcentration - TheoreticalConcentration}{TheoreticalConcentration} * 100$$

RELATIVE PERCENT DIFFERENCE (RPD)

$$RPD = \frac{|(R1 - R2)|}{(R1 + R2) / 2} * 100$$

where:

R1 = Result Sample 1

R2 = Result Sample 2

CORRELATION COEFFICIENT (R)

$$CorrCoeff = \frac{\sum_{i=1}^N W_i * (X_i - \bar{X}) * (Y_i - \bar{Y})}{\sqrt{\left(\sum_{i=1}^N W_i * (X_i - \bar{X})^2 \right) * \left(\sum_{i=1}^N W_i * (Y_i - \bar{Y})^2 \right)}}$$

With: N Number of standard samples involved in the calibration
i Index for standard samples
Wi Weight factor of the standard sample no. i
Xi X-value of the standard sample no. i
X(bar) Average value of all x-values
Yi Y-value of the standard sample no. i
Y(bar) Average value of all y-values

ATTACHMENT I (CONTINUED)
Quality Control Calculations (continued)
STANDARD DEVIATION (S)

$$S = \sqrt{\sum_{i=1}^n \frac{(X_i - \bar{X})^2}{(n-1)}}$$

where:

n = number of data points

X_i = individual data point

\bar{X} = average of all data points

AVERAGE (\bar{X})

$$\bar{X} = \frac{\sum_{i=1}^n X_i}{n}$$

where:

n = number of data points

X_i = individual data point

RELATIVE STANDARD DEVIATION (RSD)

$$RSD = \frac{S}{\bar{X}} * 100$$

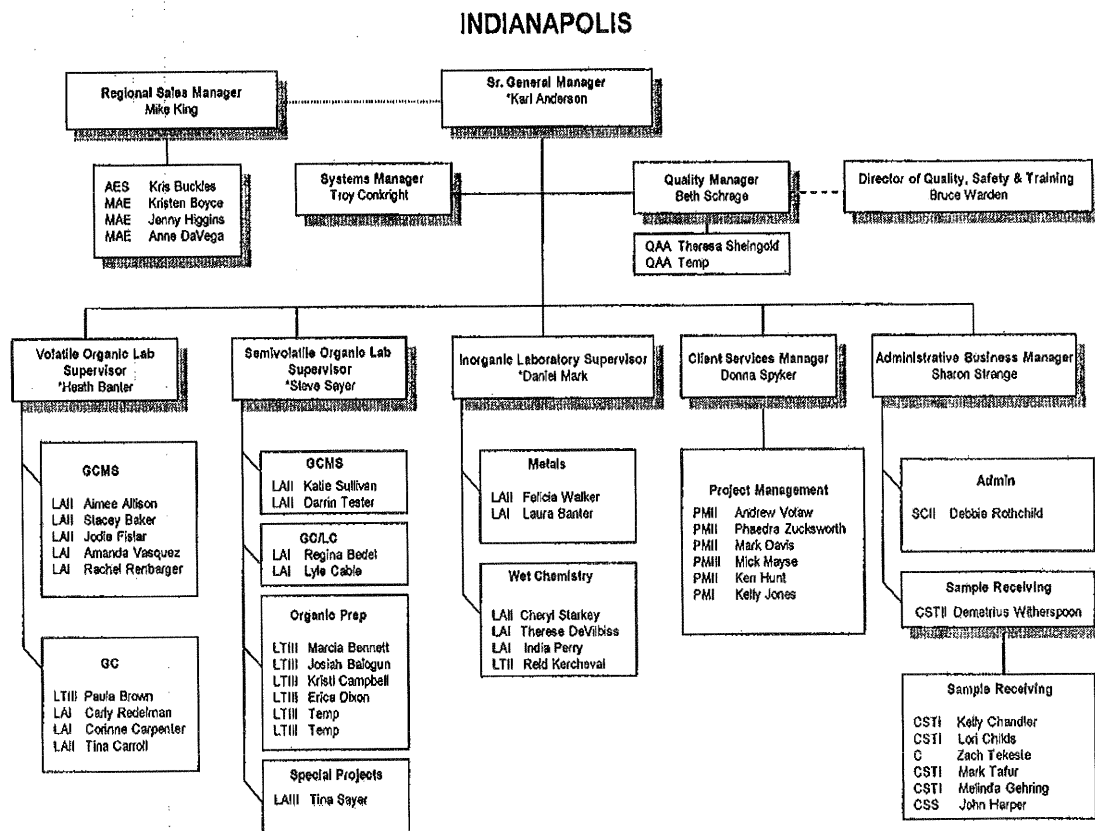
where:

S = Standard Deviation of the data points

\bar{X} = average of all data points

ATTACHMENT IIA

PASI – INDIANAPOLIS ORGANIZATIONAL CHART



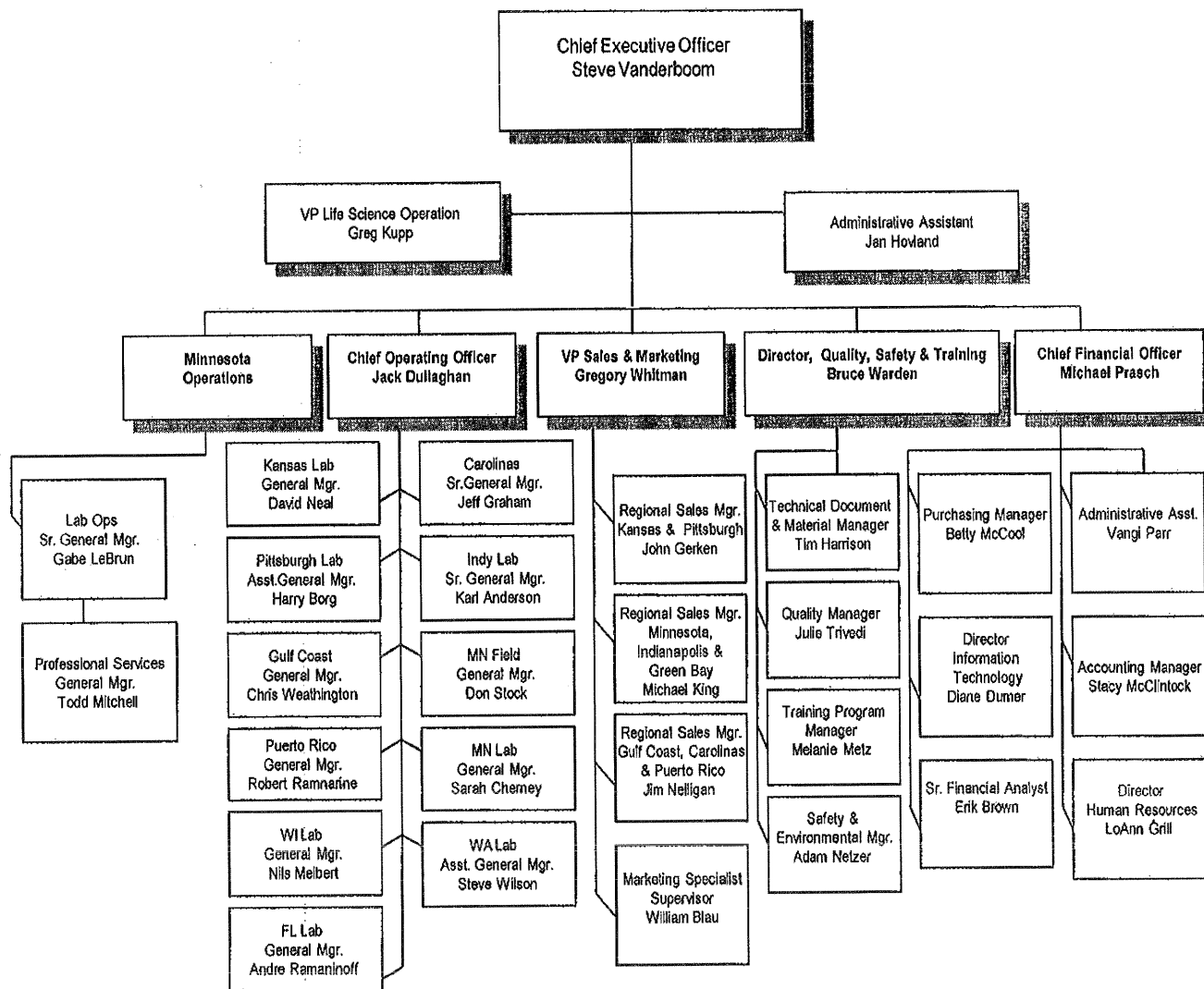
*NELAC TECHNICAL DIRECTOR

Last Revised March 3,
2009

ATTACHMENT IIB

PASI – CORPORATE ORGANIZATIONAL CHART

CORPORATE/MANAGEMENT STRUCTURE





ATTACHMENT III

PASI – INDIANAPOLIS EQUIPMENT LIST

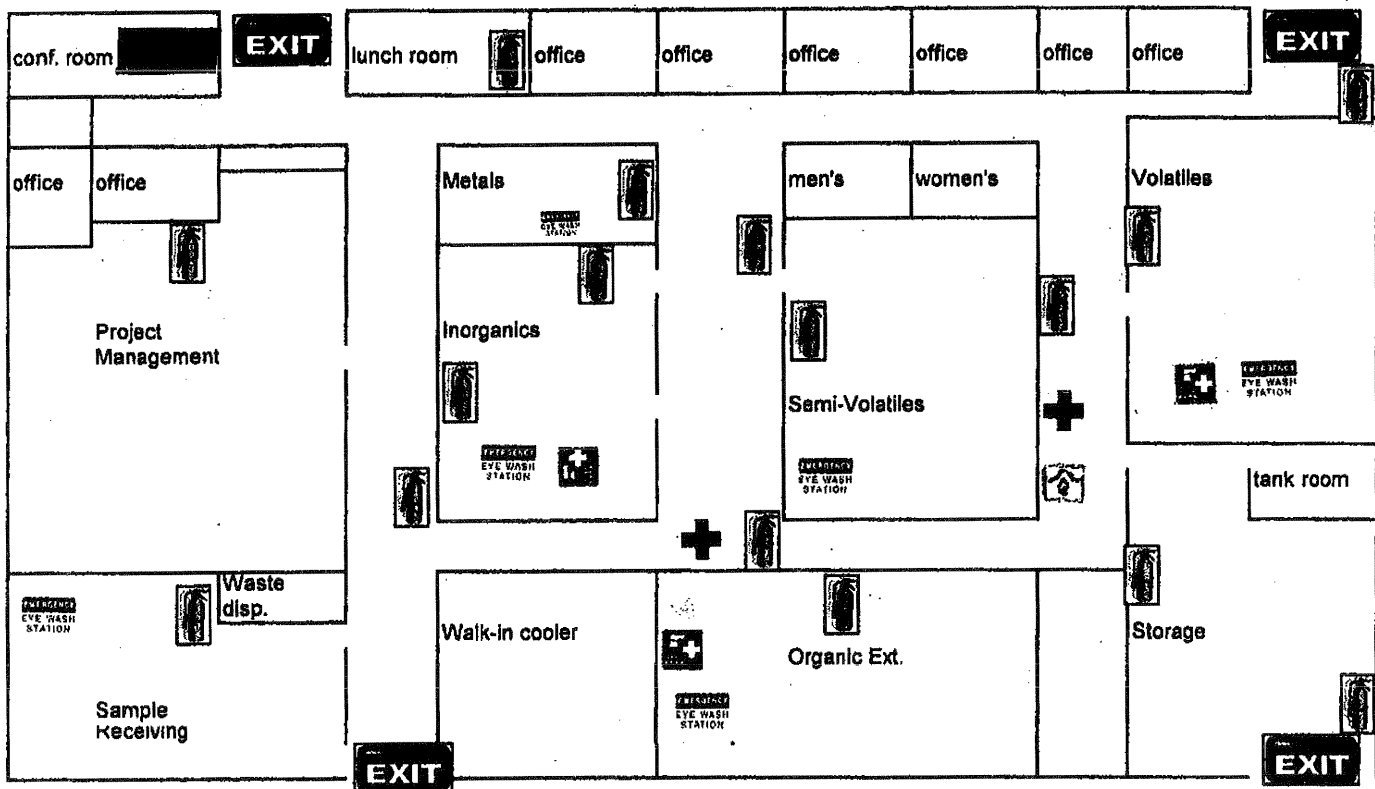
INSTRUMENT	MANUFACTURER	MODEL NUMBER	DETECTOR	AUTOSAMPLER	SERVICE ANALYSIS	AGE (yrs)
GC/MS (50MSV1)	Hewlett-Packard	6890	MS (5973)	Archon	8260/624/5035	5
GC/MS (50MSV2)	Hewlett-Packard	5890	MS (5971A)	Centurion	8260/624/5035	9
GC/MS (50MSV3)	Hewlett-Packard	6890	MS (5973)	Archon/PT2	8260/624/5035/524.2	6
GC/MS (50MSV4)	Agilent	6850	MS (5975B)	Centurion	8260/624/5035	<1
GC/MS (50MSV5)	Hewlett-Packard	6890	MS (5973)	Archon/PT2	8260/624/5035	5
GC/MS (50MSS1)	Hewlett-Packard	6890	MS (5973)	HP 7683	8270/SIM	5
GC/MS (50MSS2)	Hewlett-Packard	5890	MS (5972)	HP 7673	8270	9
GC/MS (50MSS3)	Hewlett-Packard	5890	MS (5972)	HP 7673	Not In Service	9
GC/MS (50MSS4)	Hewlett-Packard	6890	MS (5975)	HP 7683B	8270/SIM	2
GC (50GCS4)	Hewlett-Packard	5890	BCD	HP 7673	8081/8082	15
GC (50GCS5)	Hewlett-Packard	5890	BCD	HP 7673	8081/8082	15
GC (50GCS6)	Hewlett-Packard	6890	FID	HP7683B	DOR(8015)	1
GC (50GCV5)	Hewlett-Packard	5890	PID	Archon	8021/602	9
GC (50GCV6)	Hewlett-Packard	5890	PID	Archon/PT2	8021/602	9
GC (50GCV7)	Hewlett-Packard	5890	PID	Archon	8021/602	9
GC (50GCV2)	Hewlett-Packard	5890	FID	Archon	GRO(8015)	10
GC (50GCV1)	Hewlett-Packard	6890	PID	Centurion	8021/602	1
GC (50GCS2)	Hewlett-Packard	5890	FID	HP 7673	Glycols(8015)	9
GC (50GCS3)	Hewlett-Packard	5890	FID (GC Express)	HP 7673	DRO(8015)	9
GC (50GCS1)	Hewlett-Packard	5890	FID	HP 7673	IH / special projects	9
Trace ICP (50ICP1)	TJA	ICAP61E	n/a	n/a	6010/200.7	15
Trace ICP (50ICP2)	Thermo Scientific	iCAP 6500	n/a	n/a	6010/200.7	1
Mercury Analyzer	Perkin Elmer	FIMS	n/a	n/a	7470/7471/245	8
Auto Analyzer	Lachat	Quick Chem	n/a	n/a	CN,NO3,Cl,Phenol, NH3,TKN	10
COD Reactor	Hach	n/a	n/a	n/a	COD	15
Ignitability Tester	Pensky-Martens	n/a	n/a	n/a	flashpoint	9
Spectrophotometer	Spec 20	Labtronics	n/a	n/a	COD, Sulfide	7
Spectrophotometer	Hach	DR5000	n/a	n/a	Sulfate,Cr6+,Fe2+, PO4	2
pH/ISE Meter (50WET4)	Accumet	AR25	n/a	n/a	pH	6
pH/ISE Meter (50WET5)	Accumet	AR25	n/a	n/a	Fluoride, DO	5
HPUX server (Target)	Thermolab systems	Target 3.4	n/a	n/a	n/a	
Procurve HP switch	Hewlett-Packard	4000M	n/a	n/a	n/a	
Adtran CSU/DSU	Adtran	TSU 600	n/a	n/a	n/a	
Cisco Router	Cisco	2500 series	n/a	n/a	n/a	
Linux Bridge Server	n/a	n/a	n/a	n/a	n/a	
Novell Netware IBM eServer	IBM eServer	xSeries220	n/a	n/a	n/a	
VPN Server	IBM eServer	xSeries221	n/a	n/a	n/a	
EPIC Server	IBM clone	xSeries222	n/a	n/a	n/a	
Oracle Server	IBM clone	xSeries223	n/a	n/a	n/a	

UPDATED 3-9-2009

ATTACHMENT IV

PASI – INDIANAPOLIS FLOOR PLAN

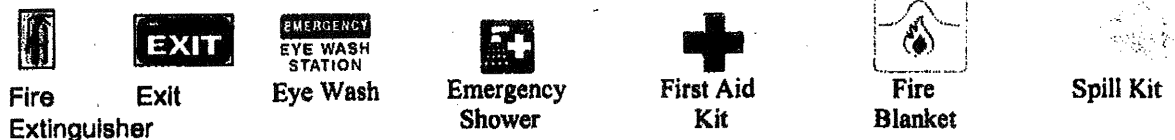
Safety Map



Pace Analytical Services, Inc.
7726 Moller Rd.
Indianapolis, IN 46268
(317)875-5894

www.pacelabs.com

Key:





ATTACHMENT V

PASI – INDIANAPOLIS SOP LIST

SOP Title	SOP Number	Revision	Method	Effective Date
Alkalinity	S-IN-I-003	8	SM2320B/310.1	3/3/2008
Volatiles by GC	S-IN-O-006	10	8021B	3/17/2008
Biochemical Oxygen Demand (BOD)	S-IN-I-007	8	SM5210B	9/10/2008
Chloride	S-IN-I-008	12	SM4500Cl-E/325.2	9/10/2008
Standard and Reagent Preparation	S-IN-P-009	8	none	3/10/2008
Total Residual Chlorine (TRC)	S-IN-I-010	6	SM4500Cl-G/Hach 8167	3/3/2008
Glassware Cleaning	S-IN-P-011	8	none	3/17/2008
Chemical Oxygen Demand	S-IN-I-012	7	410.4/Hach 8000	2/28/2008
Acidity	S-IN-I-013	8	SM2310B/305.1	3/3/2008
Total Cyanide	S-IN-I-015	9	SM4500CN-E/335.4/9010C	2/11/2008
Data Review, Validation and Approval	S-IN-Q-016	9	none	8/23/2007
ICP Metals	S-IN-I-019	7	6010B	2/27/2008
ICP Metals (Ohio VAP only)	S-IN-VAP-I-019	2	6010B	2/11/2008
Diesel Range Organics (DRO)	S-IN-O-020	11	8015C	3/11/2009
Diesel Range Organics (DRO)	S-IN-VAP-O-020	10	8015C	6/16/2008
Laboratory Housekeeping	S-IN-P-023	6	none	10/23/2007
pH in waters	S-IN-I-024	7	SM4500H+B/150.1	2/11/2008
Fluoride	S-IN-I-027	9	SM4500F-C/340.2	2/27/2008
Volatiles by GC/MS (8260)	S-IN-O-029	13	8260B	3/17/2008
Volatiles by GC/MS (8260) (Ohio VAP only)	S-IN-VAP-O-029	10	8260B	9/7/2005
Acid Digestion of ICP/GFAA samples (liquids)	S-IN-I-030	7	3010/3020	2/27/2008
Acid Digestion of ICP/GFAA samples (liquids) (VAP only)	S-IN-VAP-I-030	6	3010/3020	6/18/2007
Acid Digestion of ICP/GFAA samples (solids)	S-IN-I-031	8	3050B	2/27/2008
Acid Digestion of ICP/GFAA samples (solids) (VAP only)	S-IN-VAP-I-031	7	3050	6/18/2007
Hardness	S-IN-I-032	8	SM2340BC/130.2	2/22/2008
Oxidation-Reduction Potential in Soils	S-IN-I-035	5	SM2580B	3/3/2008
Flashpoint	S-IN-I-038	6	1010A	3/3/2008
Mercury in water and soil samples	S-IN-I-040	10	7470A/7471A	3/3/2008
Mercury in water and soil samples	S-IN-VAP-I-040	1	7470A/7471A	n/a
Nitrate/ Nitrite	S-IN-I-042	11	353.2 rev.2	2/27/2008
Ammonia Nitrogen	S-IN-I-043	9	350.1 rev.2	10/23/2007
Ammonia Nitrogen (Ohio VAP only)	S-IN-VAP-I-043	8	350.1	5/11/2007
Metals in air samples	S-IN-I-046	5	NIOSH 7303	10/23/2007
Mercury in air samples	S-IN-I-047	5	NIOSH 6009	9/10/2008
Polychlorinated Biphenyls (PCBs)	S-IN-O-050	8	8082	3/17/2008
Addendum for Ohio VAP: PCBs	IN-O-050	6-add	8082	6/24/2005
Polychlorinated Biphenyls (PCBs) (Ohio VAP only)	S-IN-VAP-O-050	7	8082	n/a
Total and Respirable Dust	S-IN-I-052	5	NIOSH 0500 & 0600	2/11/2008
Separatory Funnel Extraction	S-IN-O-054	7	3510C	10/23/2007
Separatory Funnel Extraction (Ohio VAP only)	S-IN-VAP-O-054	2	3510	n/a
Internal Chain-of-Custody	S-IN-P-055	6	none	9/9/2008



SOP Title	SOP Number	Revision	Method	Effective Date
Lead in air samples	S-IN-I-057	5	40CFR appG/EQ-61189-069	9/10/2008
Laboratory Power Failure	S-IN-P-058	7	none	9/9/2008
Total Phenolics	S-IN-I-059	10	420.4, rev.1	4/8/2008
Phosphorus	S-IN-I-060	9	SM4500P-E/365.2	2/27/2008
Electronic Data Management	S-IN-P-061	7	none	9/9/2008
TCLP Extraction	S-IN-I-062	7	1311	9/10/2008
Hexavalent Chromium	S-IN-I-063	9	7196A	2/27/2008
Hexavalent Chromium (Ohio VAP only)	S-IN-VAP-I-063	7	7196A	8/15/2005
Automated Pipet Calibration	IN-P-065	8	none	9/10/2008
Charcoal Tube Analysis	S-IN-H-067	5	NIOSH 1003, 1500, 1501	9/10/2008
Semi-volatiles by GC/MS	S-IN-O-068	10	8270C	2/27/2008
Semi-volatiles by GC/MS (Ohio VAP only)	S-IN-VAP-O-068	8	8270C	6/18/2007
pH in solids	S-IN-I-069	6	9045D	2/22/2008
Alkaline Digestion for Hexavalent Chromium	S-IN-I-070	7	3060A	9/10/2008
Specific Conductance	S-IN-I-071	5	120.1	2/22/2008
Sulfate- turbidimetric	S-IN-I-073	7	ASTM D516-2/375.4	2/27/2008
Cyanide soil distillation	S-IN-I-074	7	9012	9/10/2008
Total Sulfide (methylene blue method)	S-IN-I-076	4	SM4500-S2-D/376.2	2/27/2008
Total Kjeldahl Nitrogen	S-IN-I-080	6	351.2 rev.2.0	2/27/2008
Measurement of Solids	S-IN-I-084	2	SM2540B,C,D/160 series	2/27/2008
Turbidity (nephelometric method)	S-IN-I-090	7	180.1, rev.2	4/7/2008
Percent Moisture	S-IN-I-094	5	ASTM D2974-87	9/10/2008
Deionized Water Quality testing	S-IN-Q-096	4	none	2/1/2008
Settleable Solids	S-IN-I-098	6	160.5	4/8/2008
Gasoline Range Organics	S-IN-O-109	7	8015C	2/27/2008
Free Liquids	S-IN-I-114	6	9095A	4/7/2008
Ignitability of Solids	S-IN-I-116	5	1030	4/7/2008
Density/ Specific Gravity	S-IN-I-117	5	SM2710F	4/7/2008
Resistivity in soils (AASHTO method)	S-IN-I-118	6	T288-91	3/3/2008
Operation of Waste Disposal Equipment	S-IN-P-119	3	none	3/17/2008
Volatiles by GC/MS (624)	S-IN-O-120	2	624	9/20/2007
Volatiles by GC/MS (524.2)	S-IN-O-121	2	524.2, rev. 4.1	4/9/2008
Volatiles by GC (Ohio VAP only)	IN-VAP-O-122	1	8021	9/28/2005
TSP and PM-10 analyses	S-IN-I-123	3	none	9/10/2008
Gasoline Range Organics (Ohio VAP only)	IN-VAP-O-124	1	8015	9/28/2005
QC Limit Generation and Implementation	S-IN-Q-126	1	none	4/7/2008
Laboratory Spreadsheet Validation	IN-Q-127	1	none	9/10/2008
Ferrous Iron	S-IN-I-128	1	SM3500Fe-D/Hach 8146	2/27/2008
Extraction for Free Cyanide	S-IN-I-129	1	9014	9/10/2008
Microwave Extraction	S-IN-O-130	1	3546	2/27/2008



SOP Title	SOP Number	Revision	Method	EffectiveDate
ICP Metals (200.7)	S-IN-I-131	0	200.7, rev.4.4	2/28/2008
Mercury in waters (245.1)	S-IN-I-132	1	245.1, rev.3	2/27/2008
Semi-volatiles by GC/MS (SIM)	S-IN-O-133	1	8270 SIM	4/7/2008
Semi-volatiles by GC/MS (SIM) (Ohio VAP only)	S-IN-VAP-O-133	0	8270 SIM	n/a
Alcohols by GC (modified 8015)	S-IN-O-134	0	8015 mod	n/a
Phenol by GC (NCASI method CI/WP-98.01)	S-IN-O-135	0	CI/WP-98.01	n/a
Chemical Oxygen Demand (Speedway/Marathon only)	S-IN-I-149	0	410.4/Hach 8000	2/28/2008
Sulfuric Acid Clean-up for PCBs	S-IN-O-150	2	3665	10/23/2007
Sulfur Clean-up for PCBs Copper Method	S-IN-O-151	2	3660B	10/23/2007
Receipt of Lab Supplies	S-IN-P-152	1	none	9/9/2008
Training Procedures	S-IN-Q-153	0	none	10/23/2007
Audits and Inspections	S-IN-Q-154	0	none	10/23/2007
Monitoring Storage Units	S-IN-Q-155	0	none	10/23/2007
Manual Integration	S-IN-Q-156	0	none	10/24/2007
Support Equipment	S-IN-Q-157	0	none	4/7/2008
EPIC Pro: Acode Validation	S-IN-Q-158	0	none	2/11/2008
EPIC Pro: Acode Addition/Modification	S-IN-Q-159	0	none	3/17/2008
n-Hexane Extractable Material and Silica Gel Treated HEM	S-IN-O-160	0	BPA 1664A	In Progress
Sample Management	S-IN-C-001	2	none	2/15/2008
Bottle Order Database	S-ALL-C-002	0	none	10/17/2006
Subcontracting Samples	S-IN-C-003	1	none	10/23/2007
Bottle Preparation	S-IN-C-004	0	none	9/20/2007
Operation of PacePort Customer Feedback Form	S-IN-C-005	0	none	n/a
System Security and Integrity	ALL-IT-001	1	none	4/15/2005
Server Back-up	S-ALL-IT-002	1	none	1/4/2007
Operation of PacePort Customer Feedback Form	S-ALL-IT-003	0	none	11/27/2007
Determination of Mercury by Cold Vapor Atomic Absorption Spec.	ALL-M-001	0	7470/7471	1/21/2005
Addendum: Determination of Mercury by Cold Vapor AA Spec.	ALL-IN-M-001	3	7470/7471	8/15/2005
Determination of Volatile Organics by GC/MS	ALL-O-002	1	8260	12/29/2004
Addendum: Determination of Volatile Organics by GC/MS	ALL-IN-O-002	2	8260	3/18/2005
Separatory Funnel Extraction	ALL-O-003	1	3510	8/17/2005
Addendum: Separatory Funnel Extraction	ALL-IN-O-003	3	3510	9/12/2005
Preparation of SOPs	S-ALL-Q-001	7	none	11/29/2007
Document Management	S-ALL-Q-002	1	none	11/28/2006
Document Numbering	S-ALL-Q-003	1	none	11/28/2006
Method and Instrument Detection Limit Studies	S-ALL-Q-004	4	none	6/18/2007
Purchasing of Laboratory Supplies	ALL-Q-005	2	none	8/22/2006
Laboratory Documentation	S-ALL-Q-009	1	none	2/11/2008
PE/PT Program	S-ALL-Q-010	1	none	1/10/2007
Corrective Action/ Preventative Action Process	ALL-Q-012	0	none	8/8/2005
Quality System Review	S-ALL-Q-014	1	none	3/17/2008
Sub-sampling (Sample Homogenization)	S-ALL-Q-021	1	none	12/12/2006
3P Program: Continuous Process Improvement	ALL-Q-022	1	none	2/22/2007
Standard and Reagent Management and Traceability	ALL-Q-025	1	none	n/a
Software Validation in the Laboratory	ALL-Q-026	0	none	n/a
Evaluation and Qualification of Vendors	S-ALL-Q-027	0	none	4/11/2008



SOP Title	SOP Number	Revision	Method	Effective Date
Use and Operation of Lab Track System	S-ALL-Q-028	0	none	6/18/2007
MintMiner Data File Review	S-ALL-Q-029	0	none	11/29/2007
Operation of Data Checker for EPIC Pro	S-ALL-Q-030	0	none	11/29/2007
Hazard Assessment	ALL-S-001	1	none	11/27/2007
Waste Handling	ALL-S-002	0	none	5/26/2005
Addendum: Waste Handling	ALL-IN-S-002	0	none	5/26/2005
LMS Sub-Learn Center System, Content & Training Admin. Task Guide	S-ALL-T-002	0	none	n/a
Project Management	T-ALL-C-001	0	none	9/23/2004
Administrative Business Managers	T-ALL-FIN-001	0	none	10/4/2004
Epic Pro: All Users/General Info	T-ALL-IT-001	2	none	1/18/2007
Epic Pro: PMS- Sales/ Client Setup	T-ALL-IT-002	3	none	1/18/2007
Epic Pro: PM I	T-ALL-IT-003	3	none	1/18/2007
Epic Pro: PMS- Sales II	T-ALL-IT-004	2	none	1/18/2007
Epic Pro: Login	T-ALL-IT-005	3	none	1/18/2007
Epic Pro: Lab Prep	T-ALL-IT-006	3	none	1/18/2007
Epic Pro: Lab Management	T-ALL-IT-007	2	none	1/18/2007
Epic Pro: PMII	T-ALL-IT-008	3	none	1/18/2007
Epic Pro: Detection, Reporting and Control Limits	T-ALL-IT-009	1	none	11/29/2007
Epic Pro: Standard Traceability	T-ALL-IT-010	1	none	1/18/2007
Hexane Extractable Material by Extraction and Gravimetry	T-XXX-I-001	0	1664A	
General Lachat Use	T-IN-I-002	0.A	various	n/a
General Konelab Use	T-XXX-I-003	0.Y	various	n/a
Total Organic Carbon	T-XXX-I-008	0.Y	415.2	n/a
Biochemical Oxygen Demand	T-IN-I-009	0.A	405.1	n/a
Manual Turbidimetric Determination of Sulfate	T-IN-I-010	0.A	375.4	n/a
Solids in Water and Wastewater	T-IN-I-014	0.A	160 series	n/a
Measurement of pH in Water, Soil and Wastes	T-IN-I-015	0.A	150/9040/9045	n/a
Specific Conductance	T-IN-I-016	1.A	120.1	n/a
Percent Moisture	T-IN-L-004	1.A	ASTM	n/a
Mercury	T-IN-M-001	0.A	7470/7471	n/a
ICP Metals	T-IN-M-002	0.A	6010/200.7	n/a
Organic Prep	T-IN-O-001	0.A	3510/3550	9/19/2005
Volatile Organics	T-XXX-O-002	0.Y	8260	n/a
Organochlorine Pesticides and PCBs	T-IN-O-006	0.A	8081/8082	n/a
Sub-Learn Center System Administrator Manual	T-ALL-T-001	0	none	n/a
Sub-Learn Center Content Administrator Manual	T-ALL-T-002	0	none	n/a
Sub-Learn Center Training Administrator Manual	T-ALL-T-003	0	none	n/a
Sub-Learn Center Report Manager Manual	T-ALL-T-004	0	none	n/a
Last updated: 02/23/2009				



ATTACHMENT VI

PASI – INDIANAPOLIS CERTIFICATION LIST

Accrediting Authority	Program Category	Accrediting Agency	Certification #	Expiration Date
Illinois (NELAC)	Drinking Water	IL-EPA	100418	10/12/2009
Illinois (NELAC)	Hazardous Waste	IL-EPA	100418	10/12/2009
Illinois (NELAC)	Waste Water	IL-EPA	100418	10/12/2009
Indiana	Drinking Water	ISDH	C-49-06	05/09/11
Kansas	Hazardous Waste	KDHE	E-10247	04/30/2009
Kansas	Waste Water	KDHE	E-10247	04/30/2009
Kentucky	UST	KDEP	42	01/13/2011
Ohio VAP	Hazardous Waste	OH-EPA	CL-0065	07/28/2010
Ohio VAP	Waste Water	OH-EPA	CL-0065	07/28/2010
Pennsylvania	Hazardous Waste	PA-DEP	003	07/31/2009
Pennsylvania	Waste Water	PA-DEP	003	07/31/2009
West Virginia	Hazardous Waste	WV-DEP	330	10/31/2009
West Virginia	Waste Water	WV-DEP	330	10/31/2009

ATTACHMENT VII

PASI – CHAIN OF CUSTODY

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

[illegible]

ATTACHMENT VIII **METHOD HOLD TIME, CONTAINER AND PRESERVATION GUIDE**

Parameter	Method	Matrix	Container	Preservative	Max Hold Time
2, 3, 7, 8-TCDD	1613B	Soil	8oz Glass	None	90/40 Days
2, 3, 7, 8-TCDD	1613B	Water	1L Glass	$\leq 6^{\circ}\text{C}$; $\text{Na}_2\text{S}_2\text{O}_3$ if Cl present	90/40 Days
2, 3, 7, 8-TCDD	8290	Water	1L Glass	$\leq 6^{\circ}\text{C}$; $\text{Na}_2\text{S}_2\text{O}_3$ if Cl present	30/45 Days
Acidity	SM2310B	Water	Plastic/Glass	$\leq 6^{\circ}\text{C}$	14 Days
Alkalinity	SM2320B/310.2	Water	Plastic/Glass	$\leq 6^{\circ}\text{C}$	14 Days
Alpha Emitting Radium Isotopes	9315/903.0	Water	Plastic/Glass	$\text{pH} < 2 \text{ HNO}_3$	180 days
Anions by IC, including Br, Cl, F, NO_2 , NO_3 , SO_4	300.0/300.1/ SM4110B	Water	Plastic/Glass	$\leq 6^{\circ}\text{C}$	Br, Cl, F, SO_4 (28 Days) NO_2 , NO_3 (48 Hours)
Aromatic and Halogenated Volatiles	8021	Soil	5035 vial kit	See 5035 note*	14 days
Aromatic and Halogenated Volatiles	601/602/8021	Water	40mL vials	$\text{pH} < 2 \text{ HCl}$; $\leq 6^{\circ}\text{C}$; $\text{Na}_2\text{S}_2\text{O}_3$ if Cl present	14 Days
Bacteria, Total Plate Count	SM9221D	Water	Plastic/WK	$\leq 6^{\circ}\text{C}$; $\text{Na}_2\text{S}_2\text{O}_3$	24 Hours
Base/Neutrals and Acids	8270	Soil	8oz Glass	$\leq 6^{\circ}\text{C}$	14/40 Days
Base/Neutrals and Acids	625/8270	Water	1L Glass	$\leq 6^{\circ}\text{C}$; $\text{Na}_2\text{S}_2\text{O}_3$ if Cl present	7/40 Days
Base/Neutrals, Acids & Pesticides	525.1/525.2	Water	1L Glass	$\leq 6^{\circ}\text{C}$; $\text{Na}_2\text{S}_2\text{O}_3$ if Cl present	7/30 Days
BOD/cBOD	SM5210B	Water	Plastic/Glass	$\leq 6^{\circ}\text{C}$	48 hours
BTEX/Total Hydrocarbons	TO-3	Air	Summa Canister	None	14 Days
BTEX/Total Hydrocarbons	TO-3	Air	Tedlar Bag	None	48 Hours
Chloride	SM4500Cl/9250/ 9251/9252	Water	Plastic/Glass	None	28 Days
Chlorinated Herbicides	8151	Soil	8oz Glass Jar	$\leq 6^{\circ}\text{C}$	7/40 Days
Chlorinated Herbicides	8151	Water	1L Amber Glass	$\leq 6^{\circ}\text{C}$; $\text{Na}_2\text{S}_2\text{O}_3$ if Cl present	7/40 Days
Chlorinated Herbicides	515.1	Water	1L Amber Glass	$\leq 6^{\circ}\text{C}$; $\text{Na}_2\text{S}_2\text{O}_3$ if Cl present	14/28 Days
Chlorine, Residual	SM4500Cl	Water	Plastic/Glass	None	15 minutes
COD	SM5220C/ 410.3/410.4	Water	Plastic/Glass	$\text{pH} < 2 \text{ H}_2\text{SO}_4$; $\leq 6^{\circ}\text{C}$	28 Days
Color	SM2120B,C,E	Water	Plastic/Glass	$\leq 6^{\circ}\text{C}$	48 Hours
Condensable Particulate Emissions	EPA 202	Air	Solutions	None	6 Months
Cyanide, Reactive	SW846 chap.7	Water	Plastic/Glass	None	28 Days
Cyanide, Total and Amenable	SM4500CN/9010/ 9012/335.4	Water		$\text{pH} > 12 \text{ NaOH}$; $\leq 6^{\circ}\text{C}$; ascorbic acid if Cl present	14 Days, 24 Hours if Sulfide present
Diesel Range Organics	8015	Soil	8oz Glass Jar	$\leq 6^{\circ}\text{C}$	14/40 Days
Diesel Range Organics	8015	Water	1L Glass	$\leq 6^{\circ}\text{C}$	7/40 Days
Dioxins & Furans	TO-9	Air	PUF	None	30/45 Days
EDB & DBCP	504.1/8011	Water	40mL vials	$\leq 6^{\circ}\text{C}$; $\text{Na}_2\text{S}_2\text{O}_3$ if Cl present	14 Days
Explosives	8330/8332	Water	1L Glass	$\leq 6^{\circ}\text{C}$	7/40 Days
Explosives	8330/8332	Soil	8oz Glass Jar	$\leq 6^{\circ}\text{C}$	14/40 Days
Ferrous Iron	SN3500Fe-D	Water	Glass	None	Immediate
Flashpoint/Ignitability	1010/1030	Water	Plastic/Glass	None	28 Days
Fluoride	SM4500Fl-C,D	Water	Plastic	None	28 Days
Gamma Emitting Radionuclides	901.1	Water	Plastic/Glass	$\text{pH} < 2 \text{ HNO}_3$	180 days
Gas Range Organics	8015	Water	40mL vials	$\text{pH} < 2 \text{ HCl}$	14 Days
Gasoline Range Organics	8015	Soil	5035 vial kit	See 5035 note*	14 days
Gross Alpha (NJ 48Hr Method)	NJAC 7:18-6	Water	Plastic/Glass	$\text{pH} < 2 \text{ HNO}_3$	48 Hrs




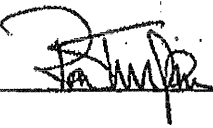
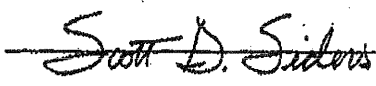
Parameter	Method	Matrix	Container	Preservative	Max Hold Time
Gross Alpha and Gross Beta	9310/900.0	Water	Plastic/Glass	pH<2 HNO ₃	180 days
Haloacetic Acids	552.1/552.2	Water	40mL Amber vials	NH ₄ Cl; ≤6°C	14/7 Days
Hardness, Total (CaCO ₃)	SM2340B,C/130.1	Water	Plastic/Glass	pH<2 HNO ₃	6 Months
Hexavalent Chromium	7196/218.6/ SM3500Cr	Water	Plastic/Glass	≤6°C	24 Hours
Hydrogen Halide & Halogen Emissions	EPA 26	Air	Solutions	None	6 Months
Lead Emissions	EPA 12	Air	Filter/Solutions	None	6 Months
Low Level Mercury	1631	Water	Glass	BrCl	90 days (if preserved and oxidized)
Mercury	7471	Soil	8oz Glass Jar	≤6°C	28 days
Mercury	7470/245.1/245.2	Water	Plastic/Glass	pH<2 HNO ₃	28 Days
Metals	7300/7303	Air	Filters	None	6 Months
Metals (and other ICP elements)	6010	Soil	8oz Glass Jar	None	6 months
Metals (and other ICP elements)	6010/6020/200.7/ 200.8	Water	Plastic/Glass	pH<2 HNO ₃	6 Months
Methane, Ethane, Ethene	RSK-175	Water	40mL vials	HCl	14 Days
Methane, Ethane, Ethene	EPA 3C	Air	Summa Canister	None	14 Days
Methane, Ethane, Ethene	EPA 3C	Air	Tedlar Bag	None	48 Hours
Nitrogen, Ammonia	SM4500NH3/350.1	Water	Plastic/Glass	pH<2 H ₂ SO ₄ ; ≤6°C	28 Days
Nitrogen, Kjeldahl	SM4500-Norg; 351.1/351.2	Water	Plastic/Glass	pH<2 H ₂ SO ₄ ; ≤6°C	28 Days
Nitrogen, Nitrate	SM4500-NO3/ 352.1	Water	Plastic/Glass	≤6°C	48 Hours
Nitrogen, Nitrate & Nitrite	SM4500-NO3/ 353.2	Water	Plastic/Glass	pH<2 H ₂ SO ₄ ; ≤6°C	28 Days
Nitrogen, Nitrite	SM4500-NO2/ 353.2	Water	Plastic/Glass	≤6°C	48 Hours
Nitrogen, Organic	SM4500-Norg/ 351.2	Water	Plastic/Glass	pH<2 H ₂ SO ₄ ; ≤6°C	28 Days
Non-Methane Organics	EPA 25C	Air	Summa Canister	None	14 Days
Non-Methane Organics	EPA 25C	Air	Tedlar Bag	None	48 Hours
Odor	SM2150B	Water	Glass	≤6°C	24 Hours
Oil and Grease/HEM	1664A/SM5520B/ 9070	Water	Glass	pH<2 H ₂ SO ₄ ; ≤6°C	28 Days
Organochlorine Pesticides & PCBs	TO-4	Air	PUF	None	7/40 Days
Organochlorine Pesticides & PCBs	8081/8082/608	Water	1L Glass	≤6°C; Na ₂ S ₂ O ₃ if Cl present	7/40 Days
Organochlorine Pesticides & PCBs	8081/8082	Soil	8oz Glass Jar	≤6°C	14/40 Days
Organophosphorous Pesticides	8141	Soil	8oz Glass Jar	≤6°C	14/40 Days
Organophosphorous Pesticides	8141	Water	1L Amber Glass	≤6°C; Na ₂ S ₂ O ₃ if Cl present	7/40 Days
Oxygen, Dissolved (Probe)	SM4500-O	Water	Glass	None	15 minutes
Paint Filter Liquid Test	9095	Water	Plastic/Glass	None	N/A
Particulates	PM-10	Air	Filters	None	6 Months
Permanent Gases	EPA 3C	Air	Summa Canister	None	14 Days
Permanent Gases	EPA 3C	Air	Tedlar Bag	None	48 Hours
pH	SM4500H+B/9040/ 9041/150.2	Water	Plastic/Glass	None	15 minutes
Phenol, Total	420.1/420.4/9065/ 9066	Water	Glass	pH<2 H ₂ SO ₄ ; ≤6°C	28 Days
Phosphorus, Orthophosphate	SM4500P/365.1/365.3	Water	Plastic	Filter; ≤6°C	Filter within 15 minutes, Analyze within 48 Hours
Phosphorus, Total	SM4500P/ 365.1/365.3/365.4	Water	Plastic/Glass	pH<2 H ₂ SO ₄ ; ≤6°C	
Polynuclear Aromatic Hydrocarbons	TO-13	Air	PUF	None	7/40 Days
Polynuclear Aromatic Hydrocarbons	8270 SIM	Soil	8oz Glass Jar	≤6°C	14/40 Days
Polynuclear Aromatic Hydrocarbons	8270 SIM	Water	1L Glass	≤6°C; Na ₂ S ₂ O ₃ if Cl present	7/40 Days

Parameter	Method	Matrix	Container	Preservative	Max Hold Time
Radioactive Strontium	905.0	Water	Plastic/Glass	pH<2 HNO ₃	180 days
Radium-226 Radon Emanation Technique	903.1	Water	Plastic/Glass	pH<2 HNO ₃	180 days
Radium-228	9320/904.0	Water	Plastic/Glass	pH<2 HNO ₃	180 days
Silica, Dissolved	SM4500Si-D	Water	Plastic	≤6°C	28 Days
Solids, Settleable	SM2540F	Water	Glass	≤6°C	48 Hours
Solids, Total	SM2540B	Water	Plastic/Glass	≤6°C	7 Days
Solids, Total Dissolved	SM2540C	Water	Plastic/Glass	≤6°C	7 Days
Solids, Total Suspended	SM2540D	Water	Plastic/Glass	≤6°C	7 Days
Solids, Total Volatile	SM2540E	Water	Plastic/Glass	≤6°C	7 Days
Specific Conductance	SM2510B/9050/120.1	Water	Plastic/Glass	≤6°C	28 Days
Stationary Source Dioxins & Furans	EPA 23	Air	XAD Trap	None	30/45 Days
Stationary Source Mercury	EPA 101	Air	Filters	None	6 Months, 28 Days for Hg
Stationary Source Metals	EPA 29	Air	Filters	None	6 Months, 28 Days for Hg
Stationary Source PM10	EPA 201A	Air	Filters	None	6 Months
Stationary Source Particulates	EPA 5	Air	Filter/Solutions	None	6 Months
Sulfate	SM4500SO4/9036/9038/375.2/ASTMD516	Water	Plastic/Glass	≤6°C	28 Days
Sulfide, Reactive	SW-846 Chap.7	Water	Plastic/Glass	None	28 Days
Sulfide, Total	SM4500S/9030	Water	Plastic/Glass	pH>9 NaOH; ZnOAc; ≤6°C	7 Days
Sulfite	SM4500SO3	Water	Plastic/Glass	None	15 minutes
Surfactants	SM5540C	Water	Plastic/Glass	≤6°C	48 Hours
Total Organic Carbon (TOC)	SM5310B,C,D/ 9060	Water	Glass	pH<2 H ₂ SO ₄ or HCl; ≤6°C	28 Days
Total Organic Halogen (TOX)	SM5320/9020/ 9021	Water	Glass; no headspace	≤6°C	14 Days
Tritium	906.0	Water	Glass	pH<2 HNO ₃	180 days
Turbidity	SM2130B/180.1	Water	Plastic/Glass	≤6°C	48 Hours
Uranium Radiochemical Method	908.0/ASTM D5174-97	Water	Plastic/Glass	pH<2 HNO ₃	180 days
Volatiles	TO-14	Air	Summa Canister	None	30 Days
Volatiles	TO-14	Air	Tedlar Bag	None	48 Hours
Volatiles	TO-15	Air	Summa Canister	None	30 Days
Volatiles	8260	Soil	5035 vial kit	See 5035 note*	14 days
Volatiles	8260	Water	40mL vials	pH<2 HCl; ≤6°C; Na ₂ S ₂ O ₃ if Cl present	14 Days
Volatiles	624	Water	40mL vials	pH<2 HCl; ≤6°C; Na ₂ S ₂ O ₃ if Cl present	14 Days (7 unpreserved)
Volatiles	524.1/524.2	Water	40mL vials	pH<2 HCl; ≤6°C; Na ₂ S ₂ O ₃ if Cl present	14 Days
Alaska DRO	AK102	Soil	8oz Glass	≤6°C	14/40 Days
Alaska DRO	AK102	Water	1L Glass	pH<2 HCl; ≤6°C	14/40 Days
Alaska RRO	AK103	Soil	8oz Glass	≤6°C	14/40 Days
Alaska GRO	AK101	Soil	5035 vial kit	See 5035 note*	14 Days
Alaska GRO	AK101	Water	40mL vials	pH<2 HCl; ≤6°C	14 Days

5035 Note: 5035 vial kit typically contains 2 vials water, preserved by freezing or, 2 vials aqueous sodium bisulfate preserved at ≤6°C, and one vial methanol preserved at ≤6°C and one container of unpreserved sample stored at ≤6°C.

Attachment IX

NELAP Certification and Scope

 <div style="text-align: center;"> <p>STATE OF ILLINOIS</p> <p>ENVIRONMENTAL PROTECTION AGENCY</p> <p>NELAP - RECOGNIZED</p> <p>ENVIRONMENTAL LABORATORY ACCREDITATION</p> </div> 
<p>Is hereby granted to</p> <p>PACE ANALYTICAL SERVICES - IN</p> <p>7726 MOLLER ROAD</p> <p>INDIANAPOLIS, IN 46268-4163</p> <p>NELAP ACCREDITED</p> <p>ACCREDITATION NUMBER #100418</p>

<p>According to the Illinois Administrative Code, Title 35, Subtitle A, Chapter II, Part 186, ACCREDITATION OF LABORATORIES FOR DRINKING WATER, WASTEWATER AND HAZARDOUS WASTES ANALYSIS, the State of Illinois formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed below.</p> <p>The laboratory agrees to perform all analyses listed on this scope of accreditation according to the Part 186 requirements and acknowledges that continued accreditation is dependent on successful ongoing compliance with the applicable requirements of Part 186. Please contact the Illinois EPA Environmental Laboratory Accreditation Program (IL ELAP) to verify the laboratory's scope of accreditation and accreditation status. Accreditation by the State of Illinois is not an endorsement or a guarantee of validity of the data generated by the laboratory.</p>
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/> <p>Ron Turpin Manager Environmental Laboratory Accreditation Program</p> </div> <div style="width: 45%;">  <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/> <p>Scott D. Siders Accreditation Officer Environmental Laboratory Accreditation Program</p> </div> </div>
<p>Certificate No.: 002150</p> <p>Expiration Date: 10/12/2009</p> <p>Issued On: 10/27/2008</p>



**State of Illinois
Environmental Protection Agency**
Awards the Certificate of Approval

Certificate No.: 002150

Pace Analytical Services - IN
7726 Moller Road
Indianapolis, IN 46268-4163

According to the Illinois Administrative Code, Title 35, Subtitle A, Chapter II, Part 188, ACCREDITATION OF LABORATORIES FOR DRINKING WATER, WASTEWATER AND HAZARDOUS WASTES ANALYSIS, the State of Illinois formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed below.

The laboratory agrees to perform all analyses listed on this scope of accreditation according to the Part 188 requirements and acknowledges that continued accreditation is dependent on successful ongoing compliance with the applicable requirements of Part 188. Please contact the Illinois EPA Environmental Laboratory Accreditation Program (IL ELAP) to verify the laboratory's scope of accreditation and accreditation status. Accreditation by the State of Illinois is not an endorsement or a guarantee of validity of the data generated by the laboratory.

Drinking Water, Inorganic

USEPA180.1

Hydrogen Ion (pH)

USEPA180.1

Turbidity

USEPA200.7R4.4

Aluminum

Beryllium

Chromium

Magnesium

Silver

USEPA200.9R2.2

Antimony

Selenium

USEPA245.1R3.0

Mercury

USEPA335.4R1.0

Cyanide

USEPA353.2R2.0

Nitrate

Arsenic

Cadmium

Copper

Manganese

Sodium

Arsenic

Thallium

Barium

Calcium

Iron

Nickel

Zinc

Lead

Nitrite

Hazardous and Solid Waste, Inorganic

1010

Ignitability

1311

TCLP (Organic and Inorganic)

1312

Synthetic Precipitation Leaching Procedure

6010B

Aluminum

Barium

Cadmium

Cobalt

Lead

Molybdenum

Selenium

Thallium

Antimony

Beryllium

Calcium

Copper

Magnesium

Nickel

Silver

Tin

Arsenic

Boron

Chromium

Iron

Manganese

Potassium

Sodium

Titanium



State of Illinois
Environmental Protection Agency
Awards the Certificate of Approval

Certificate No.: 002160

Pace Analytical Services - IN
7726 Moller Road
Indianapolis, IN 46268-4163

Hazardous and Solid Waste, Inorganic

6010B

Vanadium

Zinc
7198A
Chromium VI
7470A
Mercury
7471A
Mercury
9012A
Cyanide
9050A
Specific Conductance
9095A
Paint Filter

Hazardous and Solid Waste, Organic

6016B

Diesel range organics (DRO)

Gasoline range organics (GRO)

6021B

Benzene
m-Xylene
Toluene
6081A
4,4'-DDD
Aldrin
beta-BHC
Endosulfan I
Endrin
gamma-BHC (Lindane)
Heptachlor epoxide

Ethylbenzene
o-Xylene
Total Xylenes

MTBE (Methyl-1-butyl ether)
p-Xylene

6082

PCB-1016
PCB-1242
PCB-1260

PCB-1221
PCB-1248

PCB-1232
PCB-1254

8280B

1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloropropane
1,2,4-Trichlorobenzene
1,2-Dibromopropane (EDB)
1,2-Dichloropropane
1,3-Dichlorobenzene
2,2-Dichloropropane
2-Chlorotoluene
4-Chlorotoluene

1,1,1-Trichloroethane
1,1-Dichloroethane
1,2,3-Trichlorobenzene
1,2,4-Trimethylbenzene
1,2-Dichlorobenzene
1,3,5-TCB
1,3-Dichloropropane
2-Butanone (Methyl ethyl ketone, MEK)
2-Hexanone
4-Methyl-2-pentanone (Methyl isobutyl ketone, I

1,1,2,2-Tetrachloroethane
1,1-Dichloroethane
1,2,3-Trichloropropane
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dichloroethane
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
2-Chloroethyl vinyl ether
2-Methylnaphthalene
Acetone

State of Illinois
Environmental Protection Agency
Awards the Certificate of Approval

Certificate No.: 002150

Pace Analytical Services - IN
7726 Moller Road
Indianapolis, IN 46268-4163.

Hazardous and Solid Waste, Organic

Acrolein (Propenal)
Bromobenzene
Bromoform
Carbon tetrachloride
Chloroethane
cis-1,2-Dichloroethane
Dichlorodifluoromethane
Ethyl ether
Hexachlorobutadiene
Methyl iodide (Iodomethane)
Naphthalene
o-Xylene
sec-Butylbenzene
tert-Butylbenzene
trans-1,2-Dichloroethane
Trichloroethane
Vinyl acetate

8270C

1,2,4-Trichlorobenzene
1,4-Dichlorobenzene
2,4,6-Trichlorophenol
2,4-Dinitrophenol
2,6-Dinitrotoluene (2,6-DNT)
2-Methylnaphthalene
3,3'-Dichlorobenzidine
4-Bromophenyl phenyl ether
4-Chlorophenyl phenyl ether
Acenaphthene
Anthracene
Benzo(a)pyrene
Benzo(k)fluoranthene
Bis(2-chloroethoxy) methane
Bis(2-ethylhexyl) phthalate
Chrysene
Diethyl phthalate
Di-n-octyl phthalate
Hexachlorobenzene
Hexachloroethane
m-Cresol (3-Methylphenol)
N-Nitrosodiphenylamine
p-Cresol (4-Methylphenol)
Phenol

Wastewater, Inorganic

SM2130B, 18Ed
Turbidity

8260B

Acrylonitrile
Bromochloromethane
Bromomethane
Chlorobenzene
Chloroform
cis-1,3-Dichloropropene
Dichloromethane (Methylene chloride)
Ethyl methacrylate
Hexachloroethane
Methyl-t-butyl ether
n-Butylbenzene
p-Isopropyltoluene
Styrene
Tetrachloroethane
trans-1,3-Dichloropropene
Trichlorofluoromethane
Vinyl chloride

1,2-Dichlorobenzene
1-Chloronaphthalene
2,4-Dichlorophenol
2,4-Dinitrotoluene (2,4-DNT)
2-Chloronaphthalene
2-Nitroaniline
3-Nitroaniline
4-Chloro-3-methylphenol
4-Nitroaniline
Acenaphthylene
Benzidine
Benzo(b)fluoranthene
Benzoic acid
Bis(2-chloroethyl) ether
Butyl benzyl phthalate
Dibenz(a,h)anthracene
Dimethyl phthalate
Fluoranthene
Hexachlorobutadiene
Indeno(1,2,3-cd) pyrene
Naphthalene
N-Nitrosodiphenylamine
Pentachlorophenol
Pyrene

Acetonitrile

Benzene
Bromodichloromethane
Carbon disulfide
Chlorodibromomethane (Dibromochloromethane)
Chloromethane
Dibromomethane
Diethyl ether
Ethylbenzene
Isopropylbenzene
m-Xylene
n-Propylbenzene
p-Xylene
t-Butyl alcohol
Toluene
trans-1,4-Dichloro-2-butene
Trichlorofluoromethane
Xylenes (Total)

1,3-Dichlorobenzene
2,4,5-Trichlorophenol
2,4-Dimethylphenol
2,6-Dichlorophenol
2-Chlorophenol
2-Nitrophenol
4,6-Dinitro-2-methylphenol
4-Chloroaniline
4-Nitrophenol
Aniline
Benzo(a)anthracene
Benzo(g,h,i)perylene
Benzyl alcohol
Bis(2-chloroisopropyl) ether
Carbazole
Dibenzofuran
Di-n-butyl phthalate
Fluorene
Hexachlorocyclopentadiene
Isophorone
Nitrobenzene
o-Cresol (2-Methylphenol)
Phenanthrene
Pyridine



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Wastewater, Inorganic	SM2310B4a, 18Ed	
Acidity		
SM2320B, 18Ed		
Alkalinity		
SM2340B, 18Ed		
Hardness		
SM2510B, 18Ed		
Specific Conductance		
SM2540B, 18Ed		
Residue (Total)		
SM2540C, 18Ed		
Residue (TDS)		
SM2540D, 18Ed		
Residue (TSS)		
SM2550B, 18Ed		
Temperature		
SM4500CL-E, 18Ed		
Chloride		
SM4500CI-G, 18Ed		
Chlorine		
SM4500CN-CG, 18Ed		
Cyanide-amenable to chlorination		
SM4500F-O, 18Ed		
Fluoride		
SM4500H-B, 18Ed		
Hydrogen Ion (pH)		
SM4500NH3-H, 18Ed		
Ammonia		
SM4500NO3F, 18Ed		
Nitrate	Nitrate-Nitrite (sum)	Nitrite
SM4500O-G, 18Ed		
Oxygen - Dissolved		
SM4500P-E, 18Ed		
Phosphorus		
SM4500S-D, 18Ed		
Sulfide		
SM4500SO3B, 18Ed		
Sulfite		
SM5210B, 18Ed		
Biochemical Oxygen Demand (BOD)	Carbonaceous Biochemical Oxygen Demand (C	
USEPA120.1		
Specific Conductance		



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Wastewater, Inorganic

USEPA130.2

Hardness

USEPA150.1

Hydrogen Ion (pH)

USEPA160.1

Residue (TDS)

USEPA160.2

Residue (TSS)

USEPA160.3

Residue (Total)

USEPA160.6

Residue (Settleable)

USEPA170.1

Temperature

USEPA180.1R2.0

Turbidity

USEPA200.7R4.4

Aluminum

Barium

Cadmium

Cobalt

Lead

Molybdenum

Selenium

Thallium

Vanadium

USEPA245.1R3.0

Mercury

USEPA305.1

Acidity

USEPA310.1

Alkalinity

USEPA325.2

Chloride

USEPA330.6

Chlorine

USEPA335.4R1.0

Cyanide

USEPA340.2

Fluoride

USEPA350.1R2.0

Ammonia

USEPA351.2R2.0

Antimony

Beryllium

Calcium

Copper

Magnesium

Nickel

Silver

Tin

Zinc

Arsenic

Boron

Chromium

Iron

Manganese

Potassium

Sodium

Titanium



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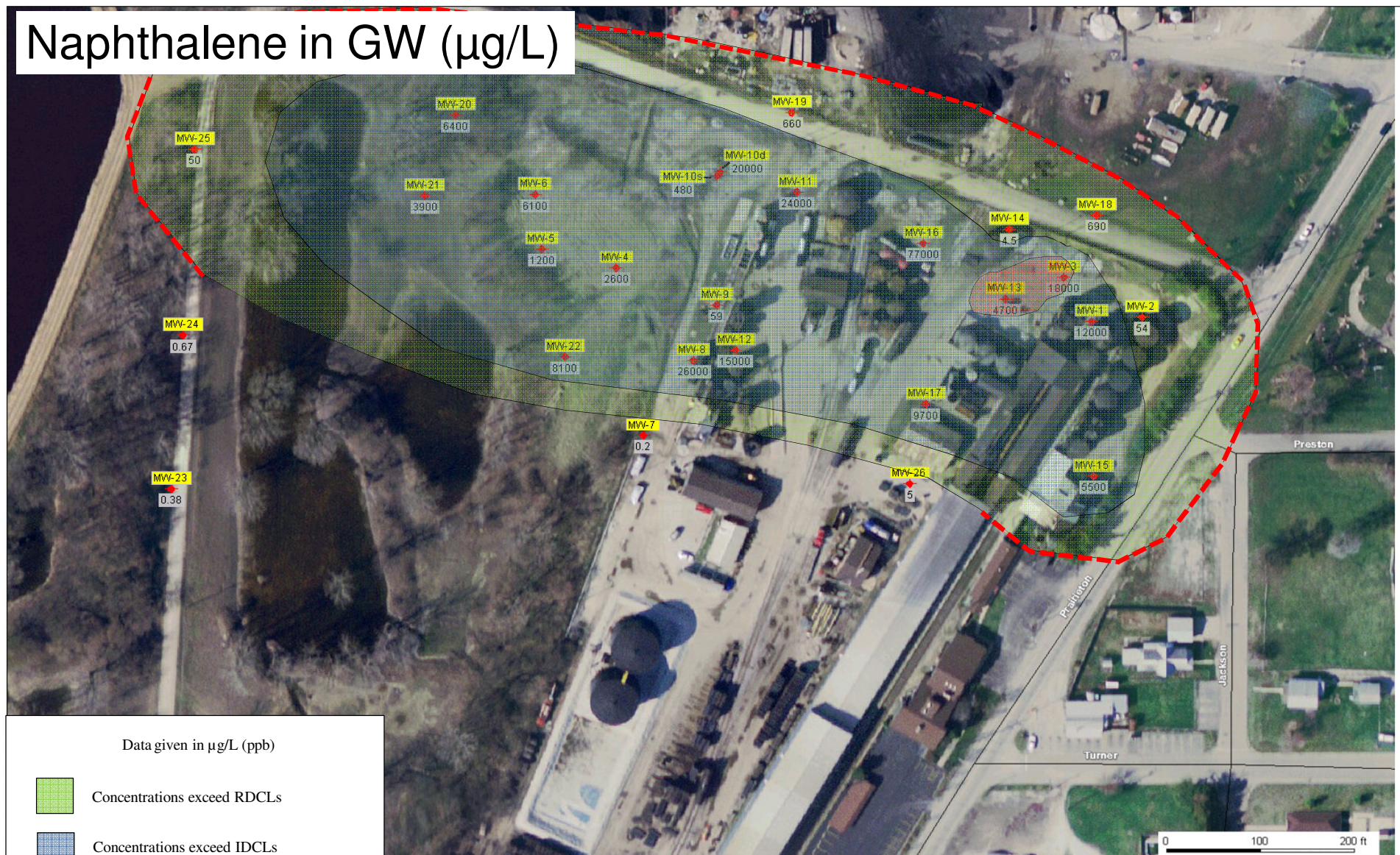
Pace Analytical Services - IN
7726 Moller Road
Indianapolis, IN 46268-4163

Wastewater, Inorganic	USEPA361.2R2.0	Total Kjeldahl Nitrogen
USEPA353.2R2.0		
Nitrate (total)	Nitrate-Nitrite (sum)	Nitrite
USEPA360.1		
Oxygen		
USEPA365.2		
Orthophosphate (as P)	Phosphorus	
USEPA375.4		
Sulfate		
USEPA376.2		
Sulfide		
USEPA377.1		
Sulfite		
USEPA405.1		
Biochemical Oxygen Demand (BOD)	Carbonaceous Biochemical Oxygen Demand (C	
USEPA410.4R2.0		
Chemical Oxygen Demand (COD)		
USEPA420.2		
Phenolics		
Wastewater, Organic		
USEPA624		
1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane
1,1-Dichloroethane	1,1-Dichloroethane	1,2-Dichlorobenzene
1,2-Dichloroethane	1,2-Dichloropropane	1,3-Dichlorobenzene
1,4-Dichlorobenzene	2-Chloroethylvinyl ether	Acrylonitrile
Benzene	Bromodichloromethane	Bromoform
Bromomethane	Carbon tetrachloride	Chlorobenzene
Chloroethane	Chloroform	Chloromethane
cis-1,3-Dichloropropene	Dibromochloromethane	Dichloromethane (Methylene chloride)
Ethylbenzene	Methyl tert-butyl ether (MTBE)	Tetrachloroethene
Toluene	trans-1,2-Dichloroethane	trans-1,3-Dichloropropene
Trichloroethene	Trichlorofluoromethane	Vinyl chloride
Xylenes (total)		

ATTACHMENT 7



Naphthalene in GW ($\mu\text{g/L}$)



Data given in $\mu\text{g/L}$ (ppb)

- Concentrations exceed RDCLs
- Concentrations exceed IDCLs
- Free Product Area

ATTACHMENT 8

WABASH RIVER BANK COAL TAR MITIGATION SCHEDULE
Former Western Tar Facility
2525 Prairieton Road
Terre Haute, Indiana
KERAMIDA Project No. 13490

Task	Date																						
	12/7/09	12/14/09	12/21/09	12/28/09	1/4/10	1/11/10	1/18/10	1/25/10	2/1/10	2/8/10	2/15/10	2/22/10	3/1/10	3/8/10	3/15/10	3/22/10	3/29/10	4/5/10	4/12/10	4/19/10	4/26/10	5/3/10	5/10/10
Wabash River Mitigation Work Plan including Health & Safety Plan and KERAMIDA Quality Management Plan																							
USEPA Review & Approval of Work Plan																							
Execution of Agreed Order																							
Provide USEPA the Name, Qualifications, and Certificate of Insurance for Selected Contractor to Perform Removal Activities, and Provide USEPA a Certificate of Insurance for KERAMIDA and the Name and Qualifications of KERAMIDA Project Coordinator																							
USEPA Review and Approval of Contractor and Project Coordinator																							
Project Coordination																							
Contractor Mobilization and Site Preparation																							
Limited Grubbing and Ground Clearing																							
Investigation Sampling Along East Property Line																							
Receipt of Laboratory Report for Investigation Sampling																							
Coal Tar Removal From Upper River Bank																							
Lower River Bank Cleanup																							
Confirmatory Soil Sampling																							
Backfilling and Site Restoration																							
Contractor Demobilization																							
Receipt of Laboratory Report for Confirmatory Soil Sampling																							
Data Validation for All Sampling Results																							
Monthly Progress Report																							
Final Remedation Completion Report																							
USEPA Review & Approval of Final Remedaiton Completion Report																							
USEPA Notice of Completion of Work																							